

# C.I.TOH



*C-210/15 XP  
Printers*

U s e r ' s M a n u a l

Thank you for purchasing the model C-210/15XP.

"This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate the computer with respect to the receiver
- move the computer away from the receiver
- plug the computer into a different outlet so that computer and receiver are on different branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the US Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-00345-4."

Note:

Use of an unshielded interface cable will void FCC certification and may cause interference to radio and television reception in a residential environment. (US. VERSION ONLY)

#### Hersteller-Erklärung

zur

Einhaltung der Funk-Entstörung von Hochfrequenzgeräten  
für nicht alleine sinnvoll betreibbare Anlagenkomponenten

Dieses Gerät entspricht als Einzelgerät den Funk-Entstöranforderungen der Postverordnung Nr. 1046/1984 bzw. der Grenzwertklasse B nach VDE 0871/6. 78.

Wird das Gerät innerhalb einer Anlage zusammen mit anderen Geräten betrieben, so muß bei Inanspruchnahme der "Allgemeinen (Betriebs-) genehmigung" nach der DBP-Verfügung Nr. 1046/1984 die gesamte Anlage der Grenzwertklasse B nach VDE 0871/6. 78 und den Auflagen nach § 2 der DBP-Verfügung Nr. 1046/1984 entsprechen.

Dies ist bei diesem einzeln geprüften Gerät meistens erfüllt, wenn es in einer Anlage (z.B. Computersystem) betrieben wird, die typgeprüft und für die ein VDE-Funkschutzzeichen mit dem Zusatz 0871-B erteilt worden ist.

Anmerkung:

Das VDE-Funkschutzzeichen bzw. die Hersteller-Erklärung soll dem in Funk-Entstörfragen sachkundigen Betreiber gewährleisten, daß die technischen Voraussetzungen der Allgemeinen Genehmigung der Deutschen Bundespost erfüllt sind.

Nicht alleine sinnvoll betreibbare Anlagenkomponenten, z.B. periphere Geräte wie Drucker, Monitore, Datenspeicher — auch wenn sie in einer bestimmungsgemäßen Anlage geprüft wurden und mit einem Funkschutzzeichen mit dem Zusatz 0871-B/P gekennzeichnet sind — gewährleisten nicht immer, daß bei beliebiger, eventuell unsachgemäßer Zusammenschaltung einzelner geprüfter und gekennzeichneter Komponenten auch die gesamte Anlage in Ordnung ist.

C. Itoh Electronics Corp.  
November 1986

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November 1986

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# **CHAPTER 1**

## **OVERVIEW**

**Congratulations on your choice of this printer! C-210/15XP models print high-quality hard copy at fast speeds. A compact, light-weight design optimizes flexibility. Users can integrate the printers freely into a wide range of mini- and micro-computer based systems.**

**Advanced functions handle bit-image graphics as well as text in numerous foreign languages. The printer's sturdy, reliable construction guarantees many years of trouble-free service. And the excellent cost-performance will satisfy even the most budget-conscious users.**

**The specifications and functions of C-215XP printers basically comply with those of the C-210XP printers. Therefore, only the different points between the C-210XP and the C-215XP printers are explained in this user's manual.**

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## 1.1 Features of Model C-210/15XP

---

The printer provides a very large selection of features.

**a. Two in One**

This printer provides the following two functions.

- 1) IBM® Proprinter® Compatible
- 2) EPSON® Compatible

**b. High-speed Printing**

A high print speed of 180 CPS is available in DP (Data Processing) mode.

**c. High-quality Print**

High-quality print is produced in NLQ (Near Letter Quality) mode which can be chosen by a switch on the front panel.

**d. Paper Handling Features**

Paper is easily loaded and can be fed through the printer by friction feed and also by push feed which is provided by the built-in tractors.

**e. Proportional Printing**

Proportional Printing mode allows fine printing.

**f. User Defined Characters**

Custom DP and NLQ characters can be designed and downloaded into the printer's RAM.

**g. Auto Sheet Feeder (Optional)**

Installation of an optional auto sheet feeder permits automatic feed of cut sheet paper.

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EPSON® is a registered trademark of SEIKO EPSON Corporation.

## 1.2 Preparation Prior to Operation

### 1.2.1 Names of Printer Parts

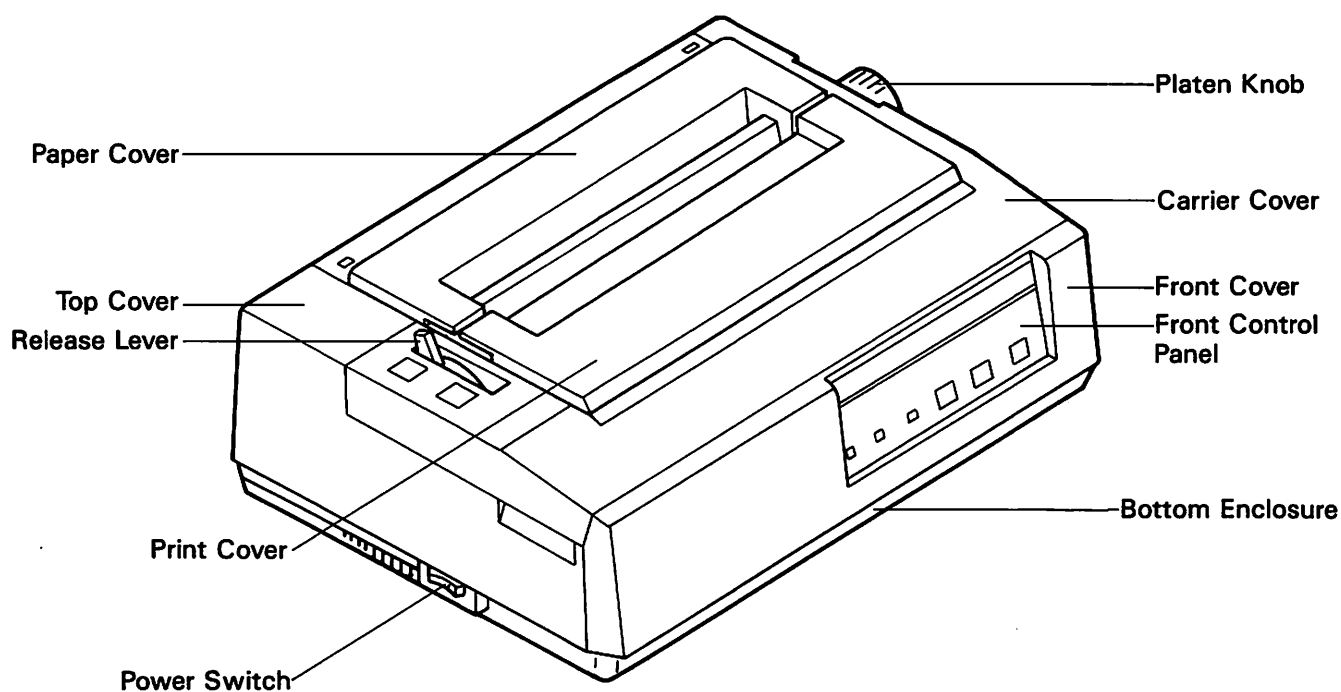


Fig. 1-1

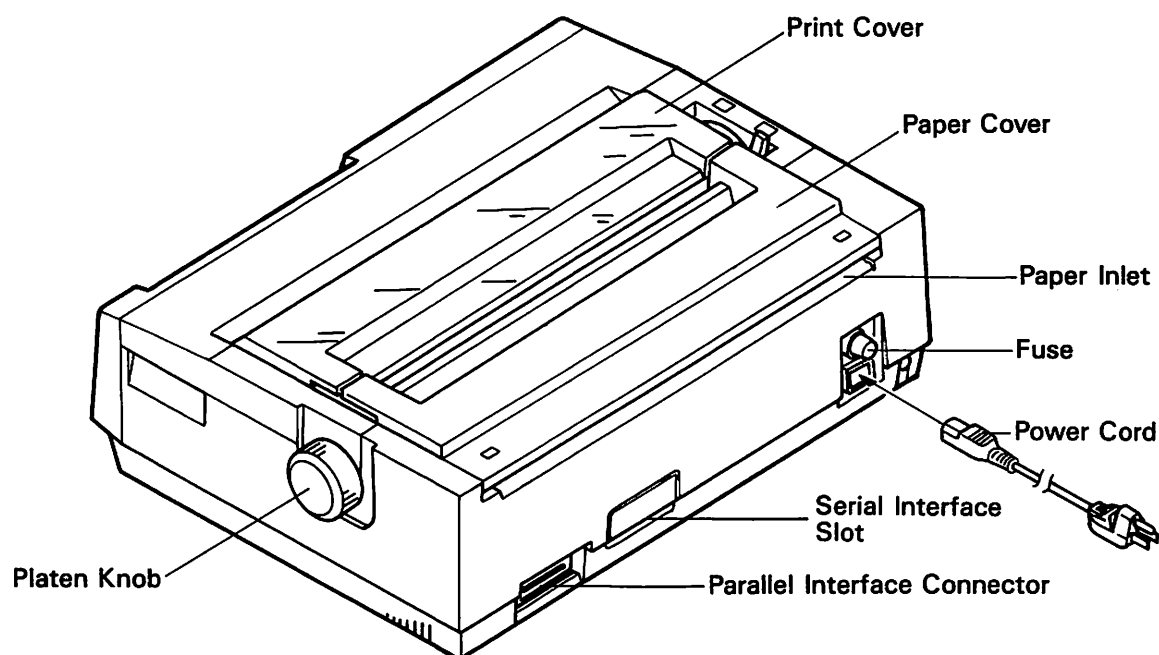


Fig. 1-2

### **1.2.2 Notes for Operation**

- a. Place your printer on a level surface.
- b. Avoid exposure to direct sunlight.
- c. Avoid extreme heat or cold.
- d. Keep away from dusty environment.
- e. Avoid external vibration.
- f. Use a specified power supply.
- g. DO NOT print without the ribbon installed. This can damage the print wires.
- h. Use a proper ribbon only. Other ribbons may damage the print wires.
- i. Ribbon life is approximately 2,000,000 characters.
- j. Use recommended paper.
- k. Keep any foreign materials from getting into the printer.

### **1.2.3 Accessories**

Ribbon Cassette  
Power Cord  
User's Manual

### **1.2.4 Optional Items**

ASF-8510. (For the C-210 series only)  
Paper Separator



## 1.3 Basic Specifications

- 1.3.1 Product Name Dot Matrix Serial Impact Printer  
 1.3.2 Print Method Logic Seek Printing  
 1.3.3 Print Speed Draft Proportional: Up to 216 CPS  
 Draft Pica : 180 CPS  
 NLQ mode also available  
 1.3.4 Line Feed Speed 1.7 IPS  
 1.3.5 Print Quality

IBM Mode  
(character set 2)

CHARACTER	DP	NLQ
ASCII	95	95
International	45	45
Graphic CG	50	50
Greek/Others	42	42

EPSON Mode

CHARACTER	DP	NLQ
ASCII	95	95
International	42	42

Unit = Character

\* The character codes are classified as follows.

ASCII	32 ~ 126
International	20, 21, 31, 128 ~ 168, 173
Graphic CG	176 ~ 223, 244, 245
Greek, Others	3 ~ 6, 26, 27, 169 ~ 172, 174, 175, 224 ~ 243, 246 ~ 255

### 1.3.6 Character Format

IBM Mode

MODE	HORIZONTAL	VERTICAL
DP	9	9
NLQ	17	17
Graphic DP	11	12
Graphic NLQ	23	24

EPSON Mode

MODE	HORIZONTAL	VERTICAL
DP	9	9
NLQ	17	17

Unit = dot

### 1.3.7 Character Pitch

#### IBM Mode

Character Pitch	Char./In.	Char./Line	
		C-210	C-215
Pica	10	80	136
Elite	12	96	163
Condensed	17.1	137	233
Proportional	*	*	*

\* : Varies according to the characters.

#### EPSON Mode

Character Pitch	Char./In.	Char./Line	
		C-210	C-215
Pica	10	80	136
Elite	12	96	163
Pica Condensed	17.1	137	233
Elite Condensed	20	160	272
Proportional	*	*	*

### 1.3.8 Graphics

#### IBM Mode

Horizontal (DPI)	Vertical (DPI)	Dot Matrix (Horizontal)
60	72	Full
120	72	Full
120	72	Half
240	72	Half

#### EPSON Mode

Horizontal (DPI)	Vertical (DPI)	Dot Matrix (Horizontal)
60	72	Full
72	72	Full
80	72	Full
90	72	Full
120	72	Full
120	72	Half
144	72	Full
240	72	Half

### 1.3.9 Type of Character

#### IBM Mode

Emphasized  
Double Strike  
Underline  
Super/Subscript  
Double Width  
Overscore  
Proportional

#### EPSON Mode

Emphasized  
Double Strike  
Underline  
Super/Subscript  
Double Width  
Italic  
Condensed  
Proportional

**1.3.10 Paper Feed Direction****Forward****Reverse (When Friction or Push Tractor is used)****1.3.11 Line Spacing****1/6", 1/8", 7/72", N/72", N/216"****\* N/216" is simulated by N/144"****1.3.12 Paper Feed Method****Friction Feed****Pin Feed (Push)****Automatic Sheet Feeder (Option)****1.3.13 Form****a. Form Width**

<b>C-210</b>	<b>C-215</b>
107.9 to 254.0 mm (4.25" to 10")	107.9 to 381.0 mm (4.25" to 15")

**b. Form Thickness****0.05 to 0.28 mm (0.002" to 0.011")****c. Copy Capability****Original + 3****(The total paper thickness should be within the range in item b, above.)****d. Type of Form****Fan-folded Sprocket Paper****Single Sheet Paper (Cut Form)****1.3.14 Inked Ribbon**

<b>Type</b>	<b>Cassette (CLABK-12802)</b>
<b>Color</b>	<b>Black</b>
<b>Dimensions</b>	13 (W) × 13,000 mm (L) 0.51" (W) × 511.81" (L)
<b>Life</b>	<b>2 Million Characters</b>

**1.3.15 Life of Head****100 Million Characters****1.3.16 Life of Printer****5 Million Lines****1.3.17 Interface****8 Bit Parallel (Centronics Compatible)****1.3.18 Power Requirements****100 V ± 10%, 115 V ± 10%, 220 V ± 10%, 240 V ± 10%  
50/60 Hz****1.3.19 Environmental Requirements****Operating      Temperature  
                         Humidity****5°C ~ 40°C (40°F ~ 104°F)****10% ~ 85% RH****Storing        Temperature  
                         Humidity****-25°C ~ +60°C (-13°F ~ +140°F)****10% ~ 85% RH**

### 1.3.20 Power Consumption

Operating

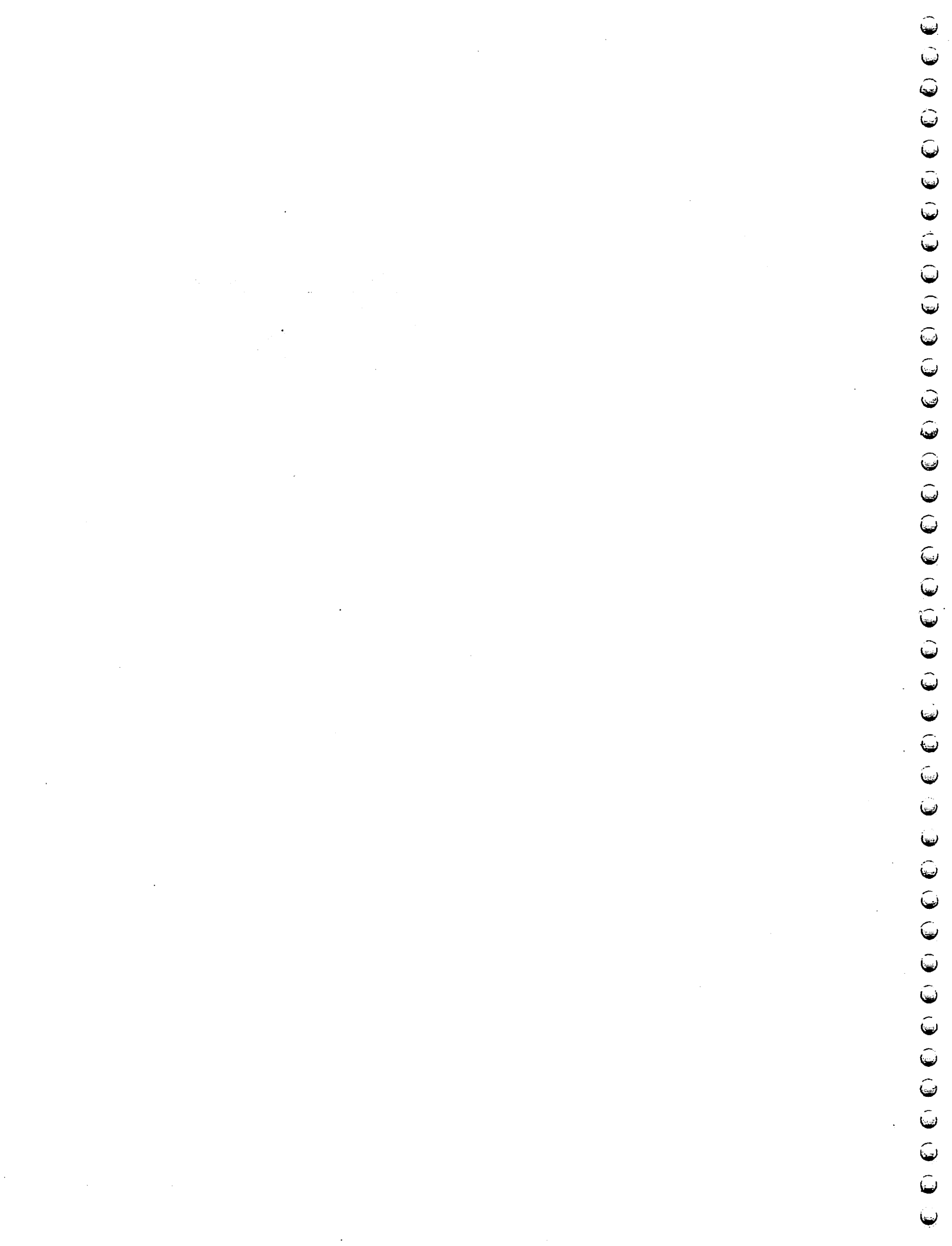
Standby

120 W

15 W

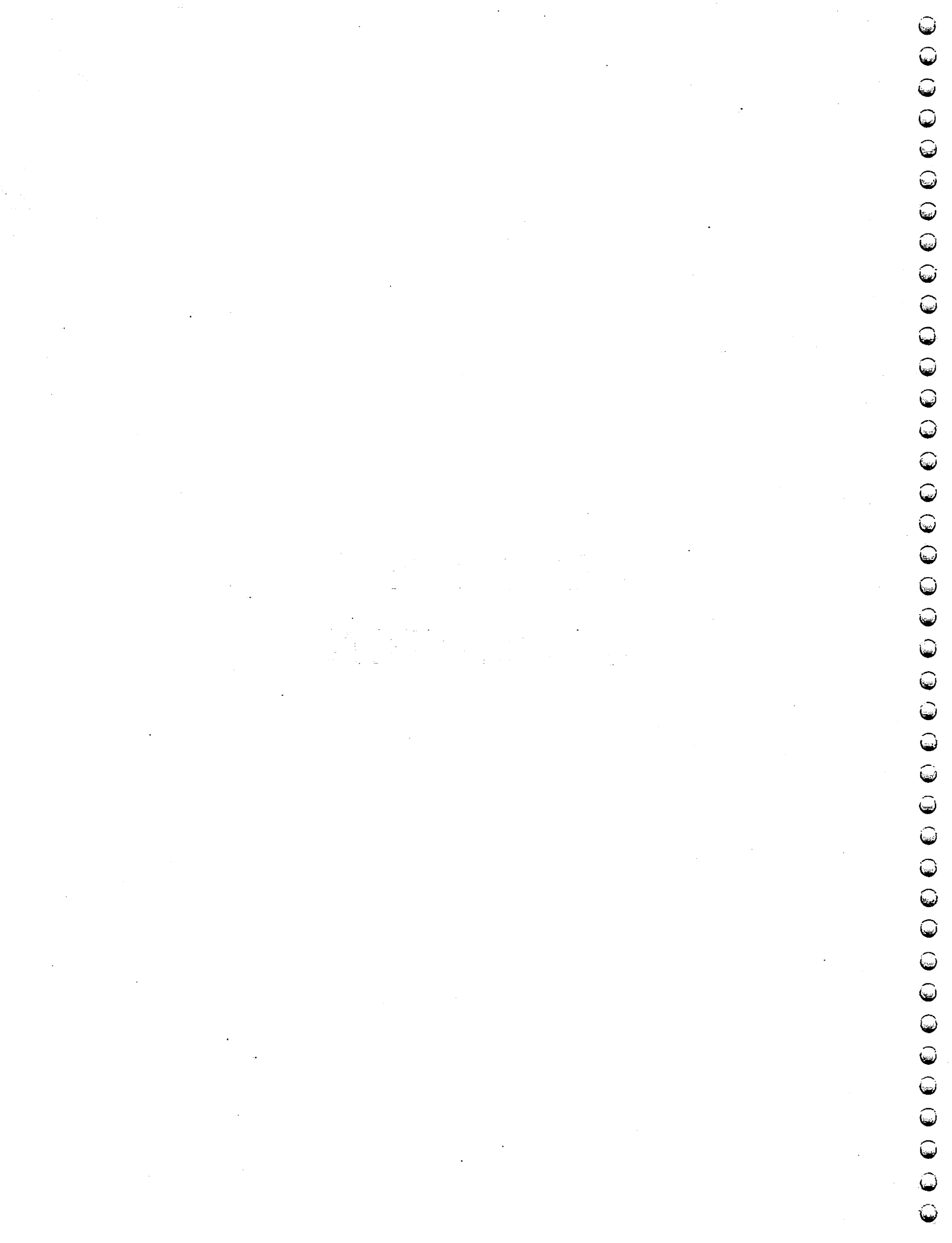
### 1.3.21 Dimensions and Weight

	C-210	C-215
Weight	9 kg (19.9 lb)	11.5 kg (25.4 lb)
Width	420 mm (16.5")	500 mm (19.7")
Depth	297 mm (11.7")	314 mm (12.4")
Height	137 mm (5.4")	114.5 mm (4.5")



# **CHAPTER 2**

# **OPERATION**



## 2.1 Unpacking Instructions

### 2.1.1 Unpacking Procedure

- 1) Open the carton.
- 2) Take out the ribbon cassette and the power supply cord contained in the top pad.
- 3) Hold the left and right side pads with both hands and carefully pull-out the printer from the carton.
- 4) Carefully remove the side pads from the printer.
- 5) Carefully remove the clear plastic cover from the printer.
- 6) Remove the carrier cover from the top cover. Then take out the cardboard retainer (This retainer protects the head during shipment).

**Note:** After unpacking check for shipping damage or mishandling. If you find damaged parts, contact your local dealer as soon as possible.

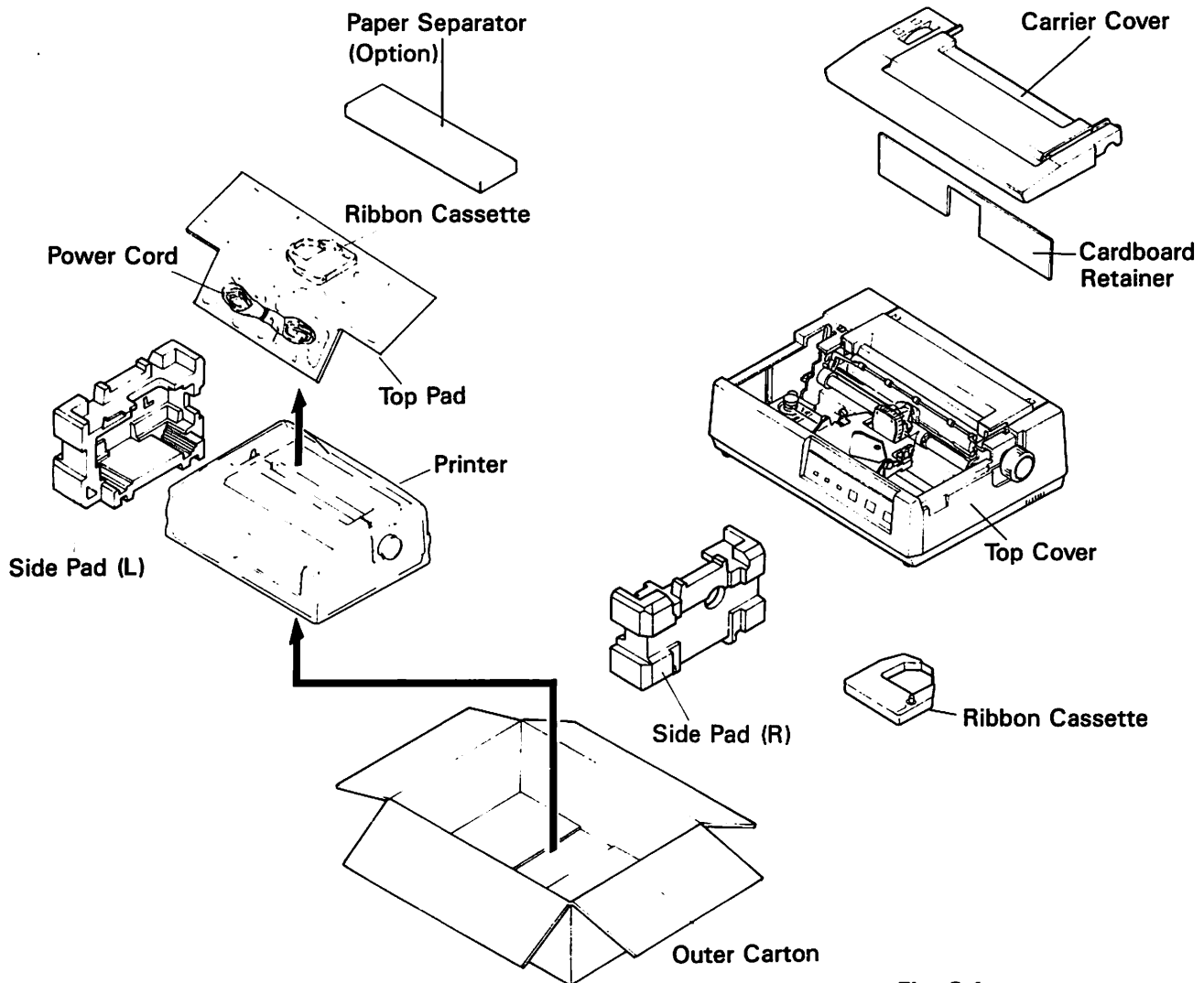


Fig. 2-1



## 2.2 Loading

### 2.2.1 Loading the Ribbon Cassette

- 1) Be sure to turn the switch "OFF".
- 2) Open the carrier cover.
- 3) Carefully move the print head assembly to a position where the rollers on the paper bail do not get in the way.
- 4) Turn the cassette drive knob clockwise in the direction of the arrow to take up the ribbon slack.
- 5) Holding the cassette with your hand, carefully insert the ribbon between the ribbon guide plate and the ribbon guide.
- 6) Then push the cassette down on to the ribbon deck.
- 7) Align the two guide projections on the bottom of the cassette with the cassette guide holes on the ribbon deck.
- 8) Be sure that the cassette supporters have fitted snugly into the cassette notches on both sides.
- 9) If the cassette supporters do not catch press the cassette down while turning the ribbon drive gear clockwise.
- 10) Check if the cassette drive gear and unit ribbon gear are engaged properly after the ribbon cassette is firmly set by turning the cassette drive knob clockwise.

Note: For easier ribbon cassette loading, move the Gap Adjusting Lever to Gap 4 position. (See Fig. 2-11, Adjustment of Gap Between Print Head and Platen)

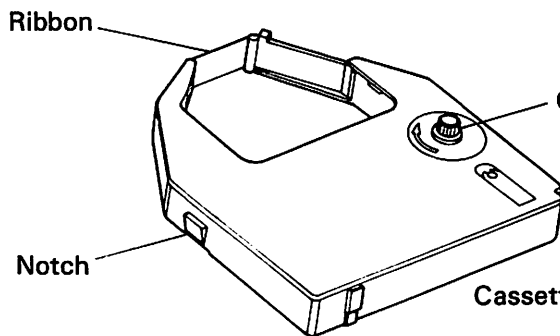


Fig. 2-2

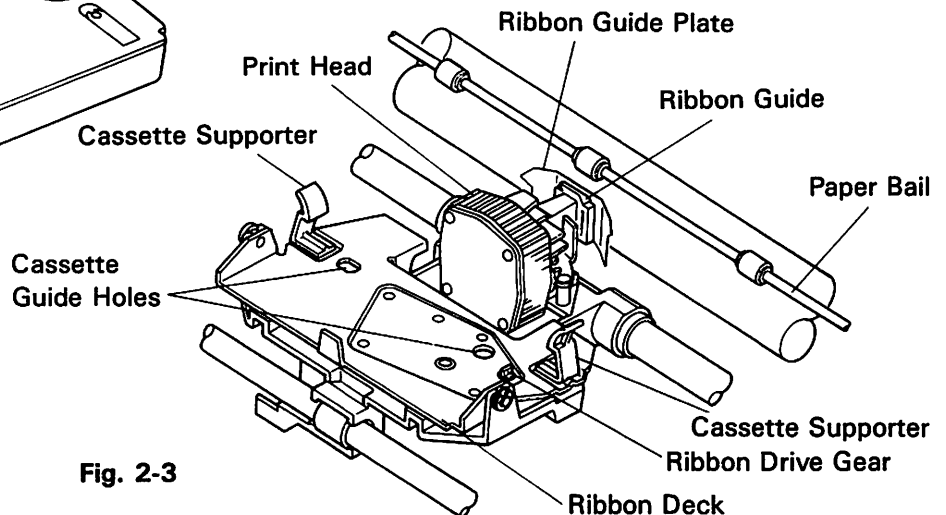


Fig. 2-3

---

## 2.3 Paper Loading

---

### 2.3.1 Pin Feed (fan-folded paper)

- 1) Open the paper cover.
- 2) Open the print cover, and pull the paper bail toward the front of the printer.
- 3) Pull the release lever toward the front. (See Fig. 2-4)

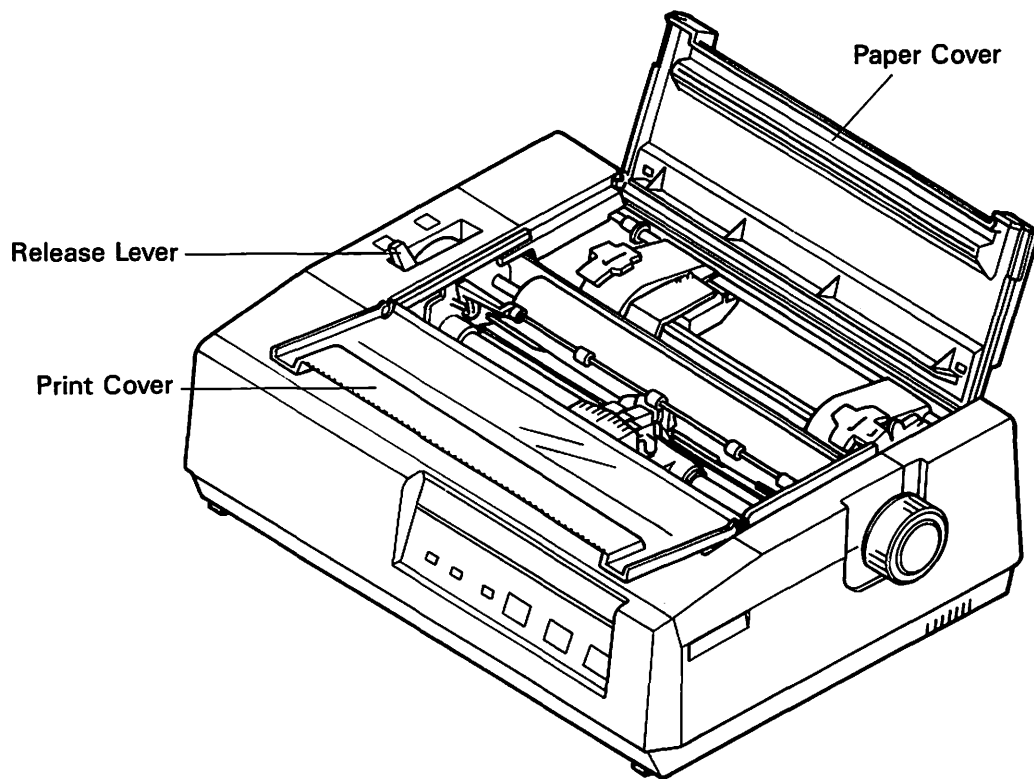


Fig. 2-4

- 4) Lift the paper retainers on the left and right sprocket tractors. Insert the paper through the opening between the top cover and the paper cover.

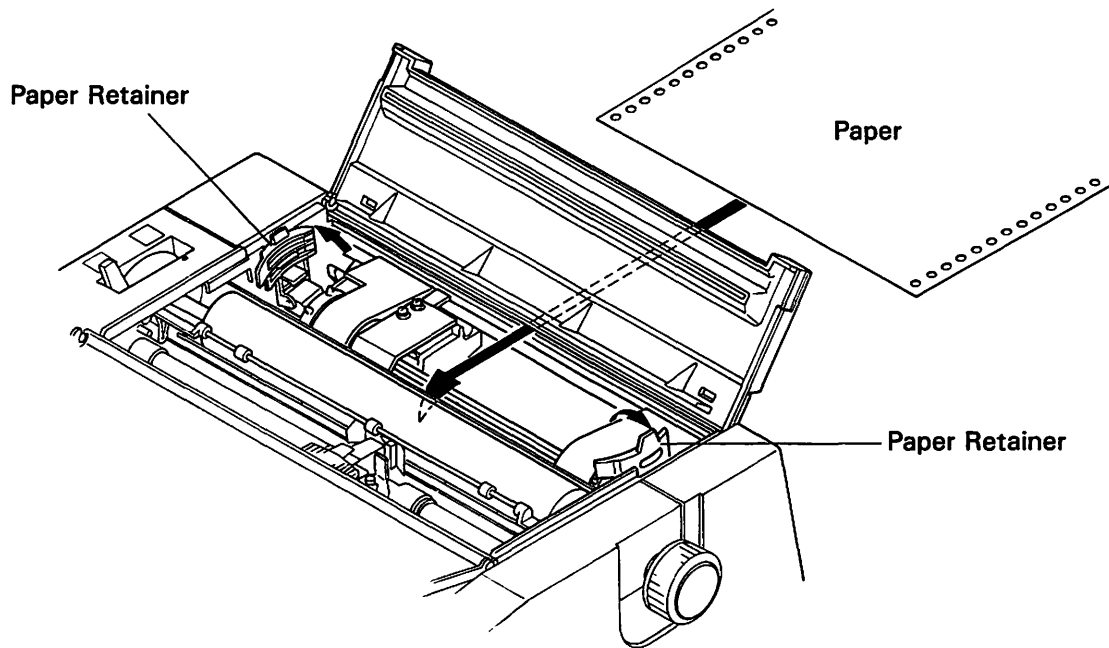


Fig. 2-5

- 5) Fit the pin holes on the paper onto the right and left sprocket tractor pins. If the width of the paper does not match the distance between the sprocket tractors, push back the right or left sprocket lever to release the sprocket tractor(s) and adjust the position of the tractor(s) to match the width of the paper. Then pull the sprocket lever(s) forward to lock the position of the sprocket tractor(s). (See Fig. 2-6)

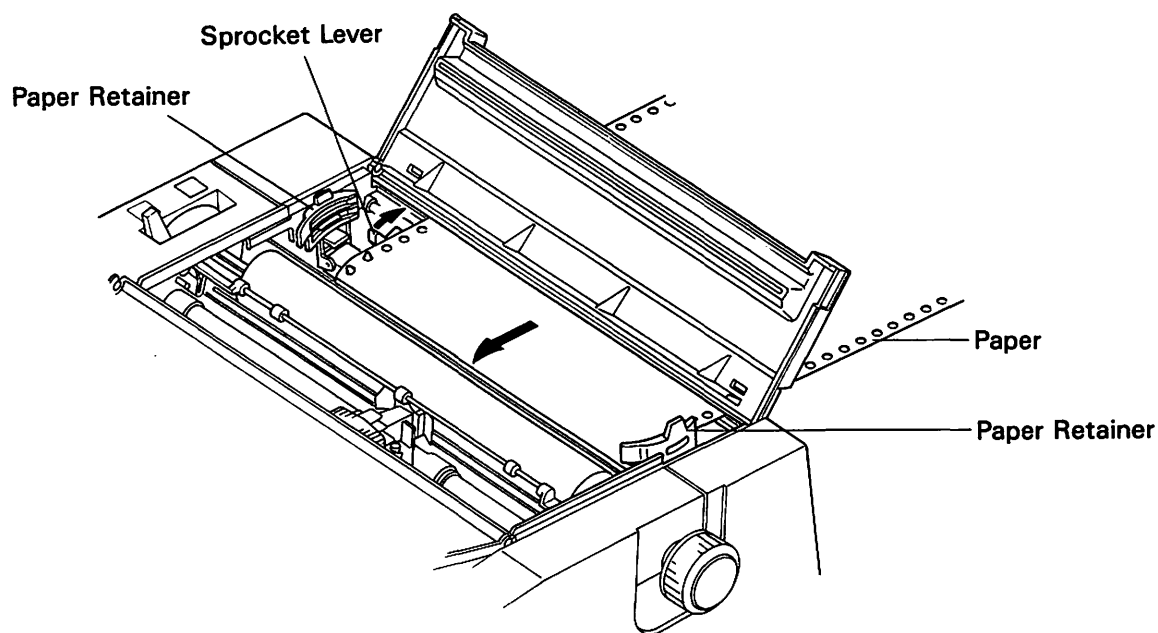


Fig. 2-6

- 6) Push down the paper retainers of the sprocket tractors. Turn the platen knob clockwise until the paper end comes out on the platen. Push back the paper bail to hold the paper against the platen and push the release lever to the rear to the "Pin Feed" position. (See Fig. 2-7)

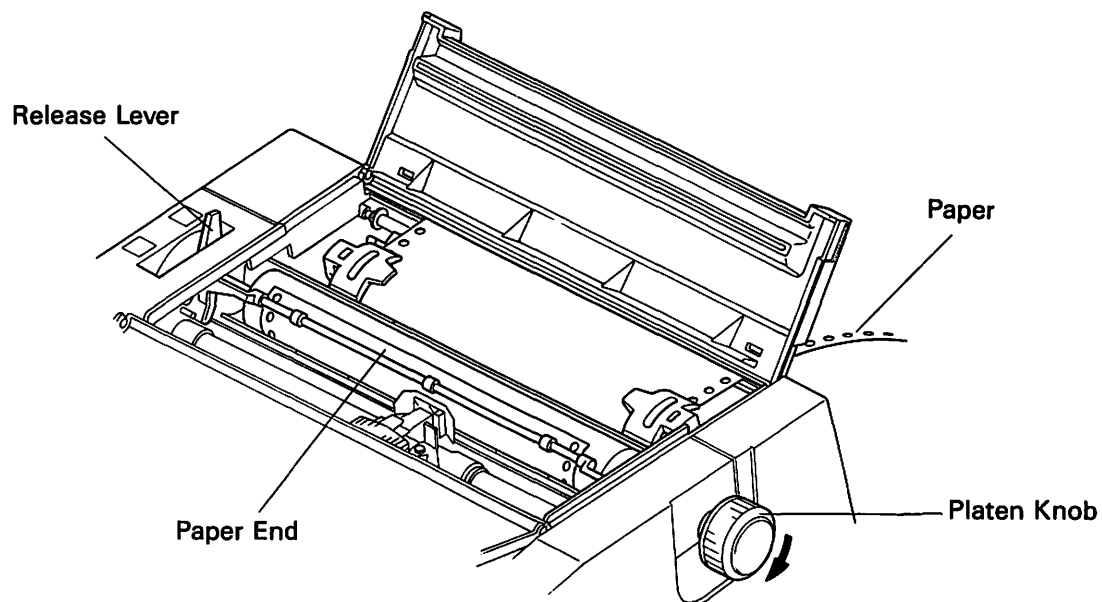


Fig. 2-7

## 2.4 Friction Feed (Roll paper and sheet paper)

2

- 1) Open the print cover and pull the paper bail toward the front of the printer.
- 2) Move the print head to the center of the printer and pull the release lever toward the front of the printer.
- 3) Insert the paper into the paper inlet on the paper cover (for roll paper, behind the paper cover). Turn the platen knob clockwise to roll in the paper.
- 4) Push the release lever toward the rear of the printer and adjust the paper so that it is straight.
- 5) Pull the release lever toward the front (to the friction feed position). Push back the paper bail and close the print cover. (See Fig. 2-8)
- 6) Finally, use the platen knob to place the paper in the initial printing position. (See Fig. 2-8)

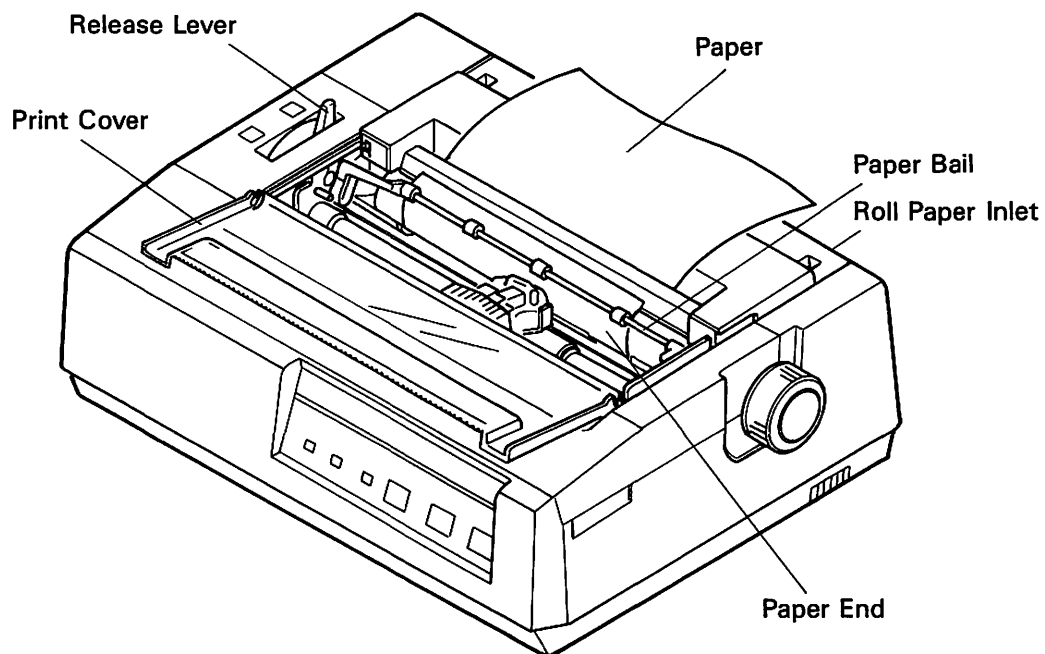


Fig. 2-8

## 2.5 Use of Paper Separator (Option)

Install the optional paper separator on the printer as follows.

- 1) Insert the legs of the paper separator into the square holes on the rear of the paper cover.

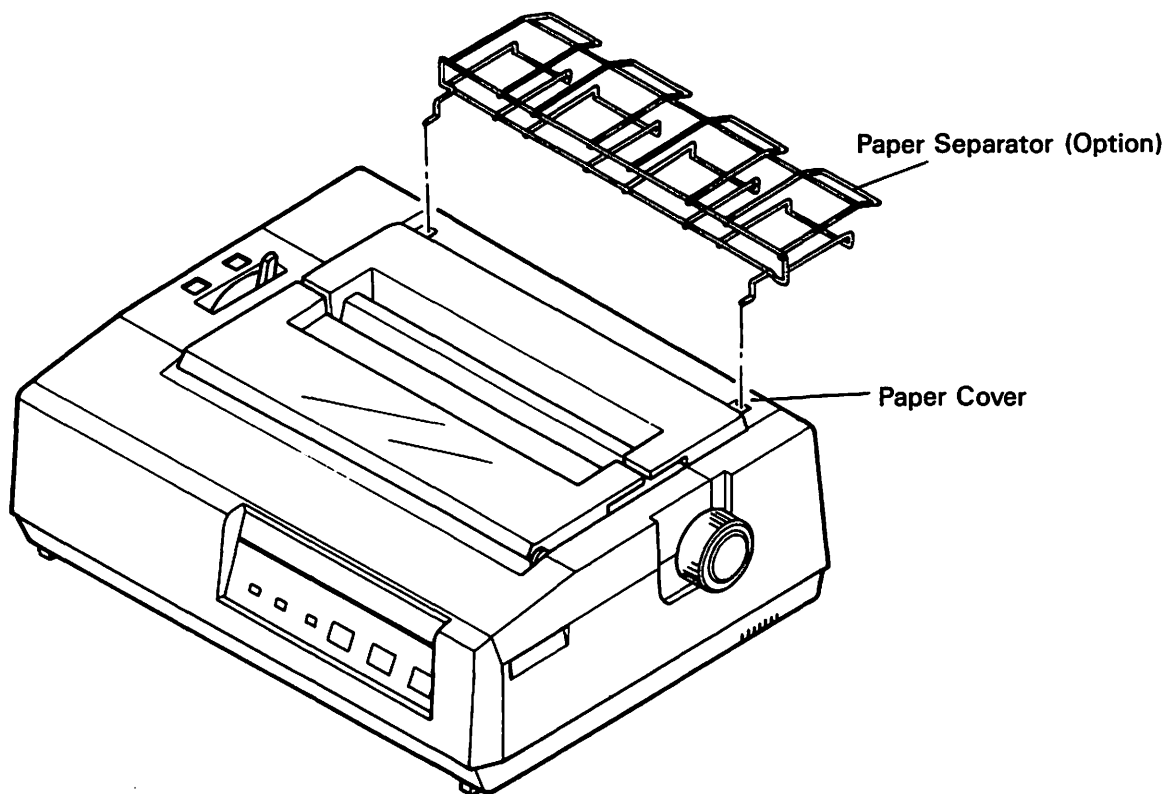


Fig. 2-9

- 2) Guide the paper through the paper separator, and into the printer (See Page 2-3, Paper Loading). When the paper end comes on the platen, draw it over the top of the paper separator, and drop it from the rear. (See Fig. 2-10)

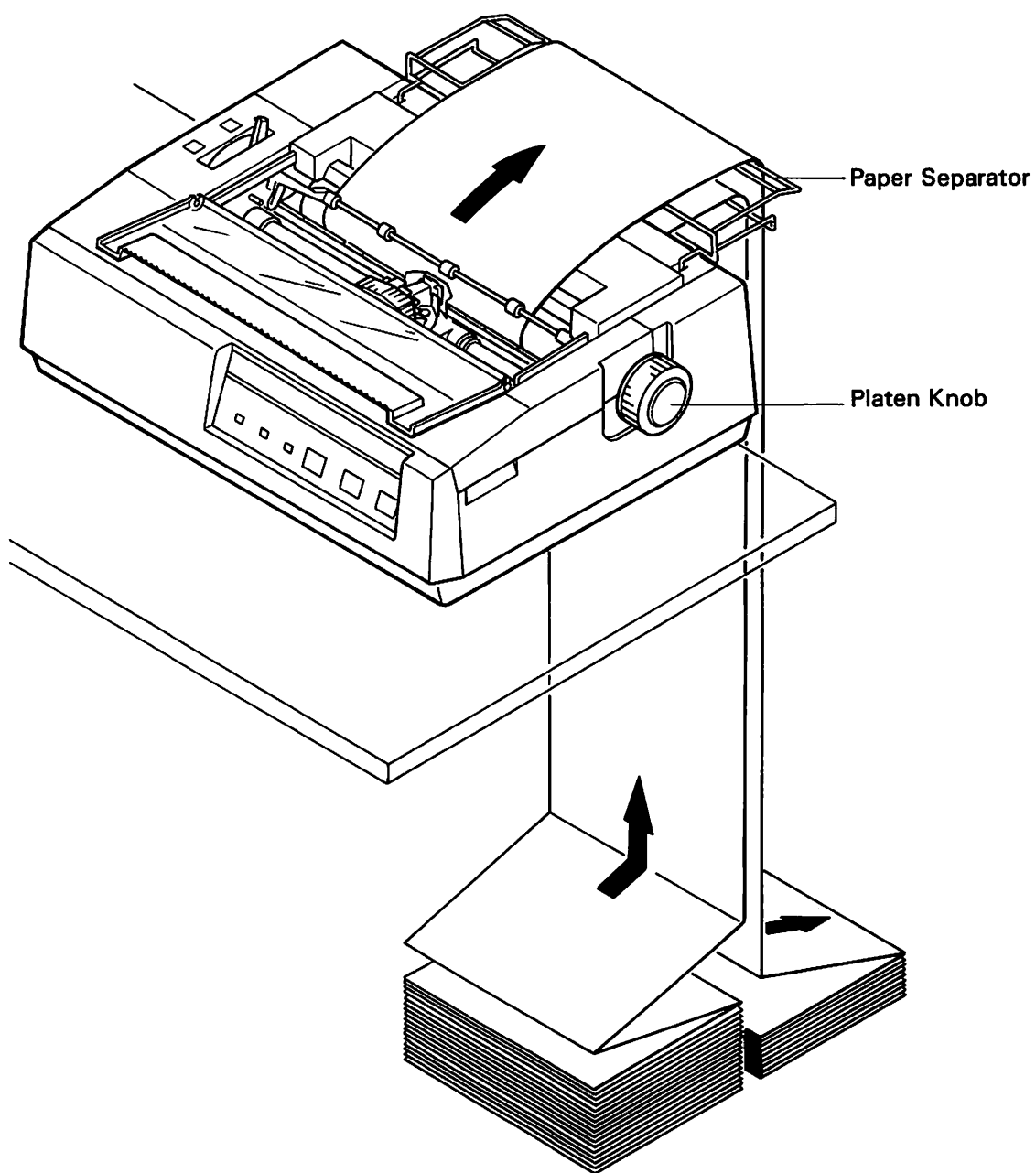


Fig. 2-10



## 2.6 Adjustment

### 2.6.1 Vertical Print Position Adjustment

After the paper is properly installed, turn the platen knob clockwise to adjust the vertical print position.

### 2.6.2 Adjustment of Gap between Print Head and Platen

The gap between the print head and the platen is adjustable in 4 steps. When the gap adjusting lever is moved fully counterclockwise, the gap between the print head and the platen will be narrowed to the limit. The lever is usually set at this position when single sheet paper is used. To obtain high quality printing, move the gap adjusting lever to adjust the gap.

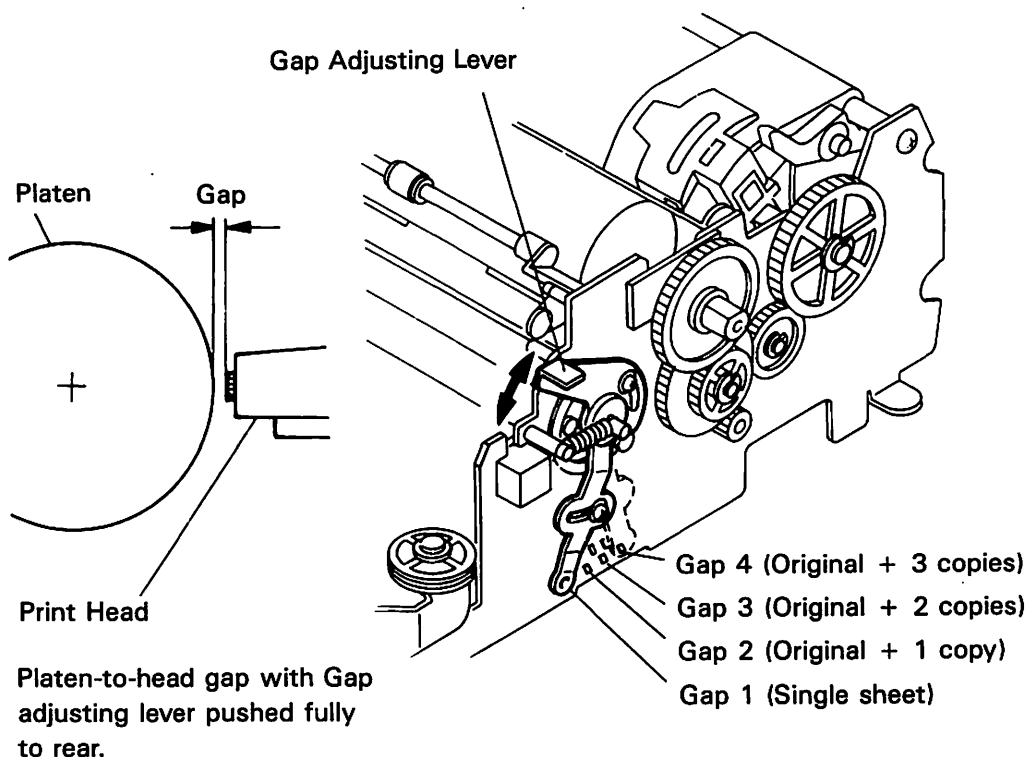
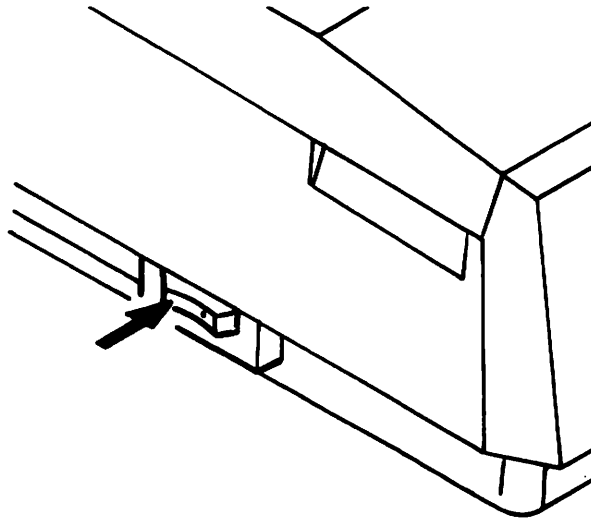


Fig. 2-11

## 2.7 Power Switch and Control Panel

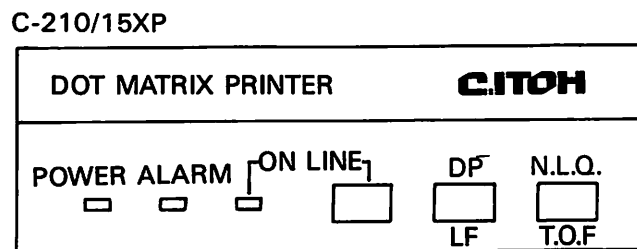
### 2.7.1 Appearance

- **Power Switch**  
The power ON-OFF switch is located on the left side of the printer.



### Fig. 2-12 Power Switch

- **Control Panel**  
The control panel is located on the front of the printer. The panel has 3 push button operating switches and 2 green LED and 1 red LED indicating lamps.



**Fig. 2-13 Control Panel**

## 2.7.2 Ordinary Function

### **ON-LINE** Switch

- 1) ON-LINE and OFF-LINE states alternate each time this switch is pressed.
- 2) Data transmission and printing from the DATA BUFFER can be stopped temporarily by pressing the **ON-LINE** switch and then immediately pressing the LF switch. To resume printing and data transmission, press the **ON-LINE** switch.

### **LF** (Line Feed) Switch

- During the OFF-LINE state
  - 1) The paper will advance one line each time the switch is pressed.
  - 2) When this switch is kept pressed, the paper will automatically feed until the switch is released.
  - 3) Line feed can be performed only when the printer is in the OFF-LINE state.
- During the ON-LINE state
  - 1) The printing mode quality changes from NLQ to DP. As the SEL lamp flickers once when you change the mode, you can make sure that the DP mode is selected. Avoid changing quality modes while the printer is printing.

### **TOF** (Top of Form) Switch

- During the OFF-LINE state
  - 1) When the switch is pressed, the paper feeds to the next TOF position.
  - 2) The paper only advances once to the next TOF even if the switch is kept pressed.
- During the ON-LINE state
  - 1) The printing mode quality changes from DP to NLQ. As the SEL lamp flickers once when you change the mode, you can make sure that the NLQ mode is selected. Avoid changing quality modes while the printer is printing.

### 2.7.3 Indicator Lamps (on Control Panel)

- 1) ON LINE lamp (GREEN) . . . . . indicates the printer is in the ON LINE mode.
- 2) ALARM lamp (RED) . . . . . indicates the Cover Open and PE Conditions.
- 3) POWER-ON lamp (GREEN) . . . . . indicates the printer power is on.

### 2.7.4 Warning Switches

#### PE (Paper Empty) Switch

- a. Detects the end of the paper or when the paper runs out.
- b. When the end of the paper is detected, the printer will print to position about 25mm from the paper edge. If the **ON LINE** switch is depressed for continued printing, it will print one line and stop.

When the paper empty is detected, the ALARM lamp lights up and the printer is deselected after printing to about 25mm from the paper edge. The printer will immediately go OFF-LINE if the PE condition is detected when either the printer is turned on or when the INPUT PRIME signal is received.

#### Cover Interlock Switch

- a. Detects when the top cover is open.
- b. When it detects the cover has been opened during the printing, the printer will automatically stop after printing one line. If detected before printing, the printer will immediately go OFF LINE and the ALARM lamp will light up.
- c. To place the printer ON LINE, press the **ON LINE** switch after the top cover is closed.

---

## 2.8 Other Functions

---

### 2.8.1 Print Start Conditions

Aside from receiving the print command from the host computer, these conditions will also activate the print start:

- a. When there is a 'buffer full' condition without receiving any print command.
- b. When data are left in the line buffer at the time of deselection of the printer. In this case, the printer prints out data in the line buffer and the head carrier stops at the position where printing of all remaining data is completed.
- c. When the print data buffer becomes full. The printer prints out data and stops the head carrier.

### 2.8.2 PE Over Ride Function

- a. When the **ON LINE** switch is pressed after detection of a PE condition, the printer goes ON LINE. One line of print data from the buffer is printed out and then the printer goes OFF LINE again.
- b. In case that the paper end is detected in the course of receiving print data or while there are print data remaining in the line buffer, the printer continues to print to a point of approximately 25mm from the paper edge then it is deselected.

### 2.8.3 Print Stop Function for Emergency

After the **ON LINE** switch is pressed put the printer OFF LINE, if the LF switch is kept pressed until one line of printing is completed, the printer will stop without printing the remaining data in the data buffer.

To print out the remaining data, press the **ON LINE** switch to put the printer in ON-LINE.

## 2.9 How to Connect the Interface Cable

The interface cable should be connected as shown in figure 2-14.

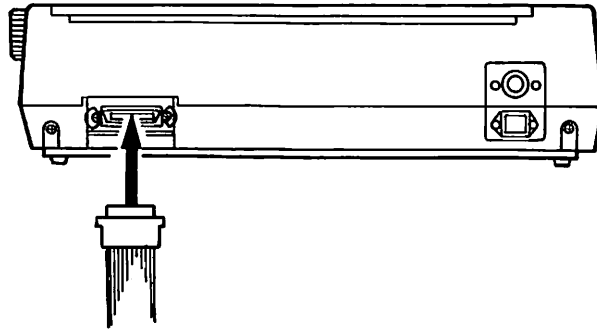


Fig. 2-14

## 2.10 Self Print Test Function

**This printer has a self test function which allows the printer to check its operation without being connected to a data source. This test can be performed in the following manner.**

- Turning the power on while pressing the **[TOF]** switch on the operation panel causes the printer to print the Type 1 self test pattern.
- Turning the power on while pressing the **[LF]** switch on the operation panel causes the printer to print the Type 2 self test pattern.

•IBM Mode      Type 1

**DIP SW 2-1 OPEN**

[illegible]

## Type 2

**DIP SW 1-8 OPEN**

```
*** DF MODE ***
♥♠♣
          15    →←  @ !"#%&'()*+,-./0123456789:;(=)?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(!)~ ÇüëáâãäåçèéëìíîäÅæçêëöüöüýðþê¥þþ
äíóññüöçöç-~½¿;«»¼½¾¿ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞßàáâãäåæçèéêëìíîïðñ
÷øùúûüýþÿ~.-_0123456789~
```

[illegible]

**DIP SW 1-8 CLOSED**

[illegible][illegible]





## 2.11 Hex Print Mode

In this mode, the data received from the computer is printed in hex representation. This mode is useful for decoding data sent from the computer. The mode can be activated in the following manner.

- Turn the printer power on while pressing the **ON LINE** switch on the operation panel.

### • IBM Mode

#### Example

#### «Sample Program»

```
10 LPRINT CHR$(27);"I";CHR$(0);  
   "ABCDEFGHIJKLMNOPQRSTUVWXYZ"  
20 LPRINT CHR$(27);"I";CHR$(2);  
   "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
```

#### «Printing».

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ  
ABCDEFGHIJKLMNOPQRSTUVWXYZ
```

#### «Hex Print Sample»

```
1B 49 00 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51  
52 53 54 55 56 57 58 59 5A 0D 0A 1B 49 02 41 42 43 44 45 46  
47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54 55 56 57 58 59 5A  
0D 0A
```

### • EPSON Mode

#### Example

#### «Sample Program»

```
10 LPRINT CHR$(27);"x";CHR$(0);  
   "ABCDEFGHIJKLMNOPQRSTUVWXYZ"  
20 LPRINT CHR$(27);"x";CHR$(1);  
   "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
```

#### «Printing».

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ  
ABCDEFGHIJKLMNOPQRSTUVWXYZ
```

#### «Hex Print Sample»

```
1B 78 00 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51  
52 53 54 55 56 57 58 59 5A 0D 0A 1B 78 01 41 42 43 44 45 46  
47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54 55 56 57 58 59 5A  
0D 0A
```

---

## 2.12 Initialization of Your Printer

---

Your printer can be initialized in the following ways:

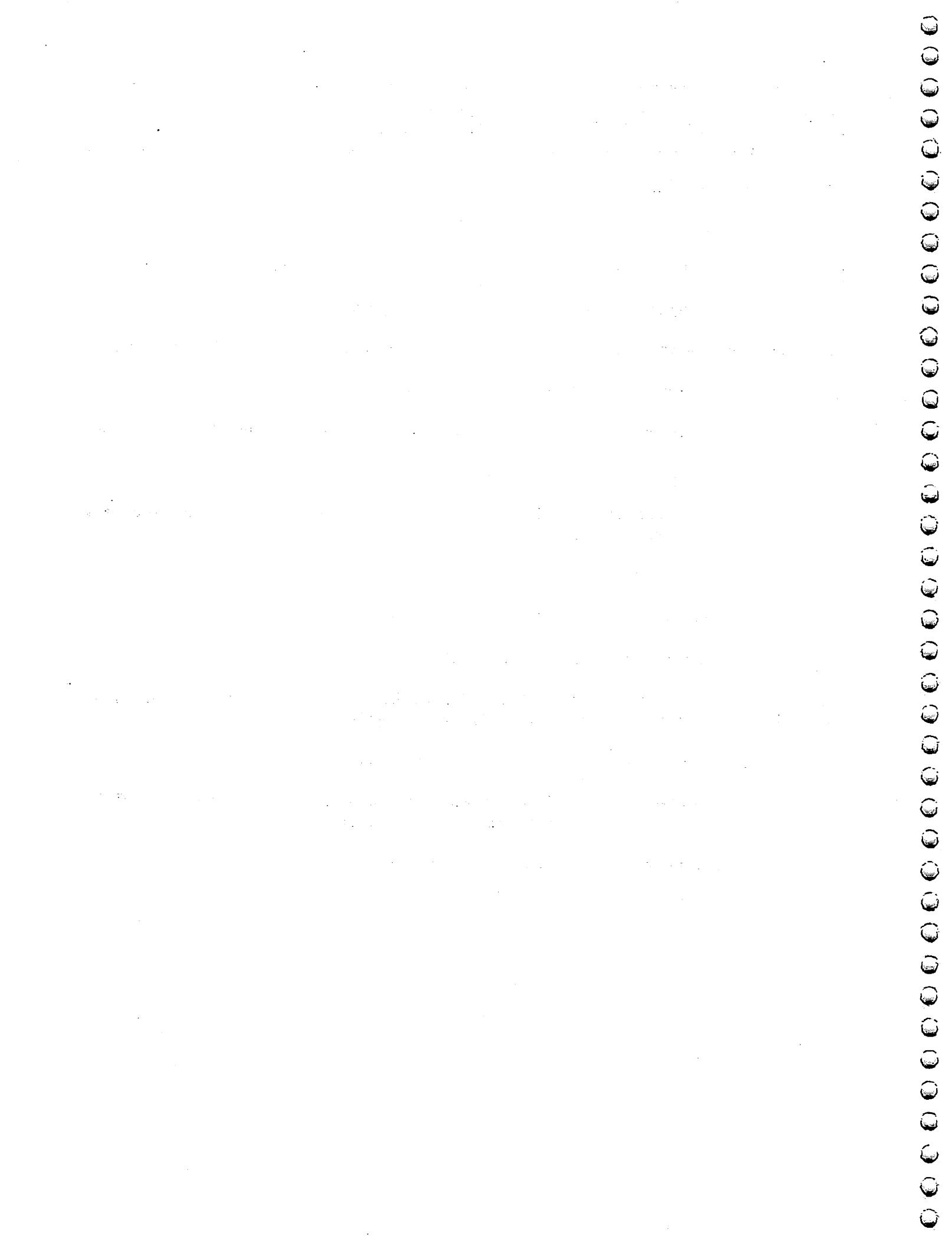
- \* Turning the power OFF and then ON.
- \* Sending the INPUT PRIME signal from the host computer.
- \* Sending the ESC @ code from the host computer (EPSON mode only).

Initializing your printer by turning the power OFF and then ON will result in the following conditions:

1. The print head will return to the home position.
2. The printer operating characteristics will correspond to the current DIP SW settings.
3. The receive buffer will be cleared.
4. Horizontal and vertical tab settings will return to default specifications—no vertical tabs, and one horizontal tab at every eighth column.
5. The TOF position will be reset at the current paper position.
6. Download characters will be cleared.
7. The print quality will be set to the DP mode.

Initializing your printer by sending the INPUT PRIME signal or the ESC @ code will result in the same conditions as listed above but with the following exceptions:

3. All data in the receive buffer will be printed out.
6. Download characters will not be cleared and the currently selected character set (ROM character set or download character set) will remain active.
7. The current print quality will not be changed.



# **CHAPTER 3**

## **DIP SWITCHES**



## 3.1 DIP Switch Location

The location of DIP Switches of C-210/15XP is as shown below.

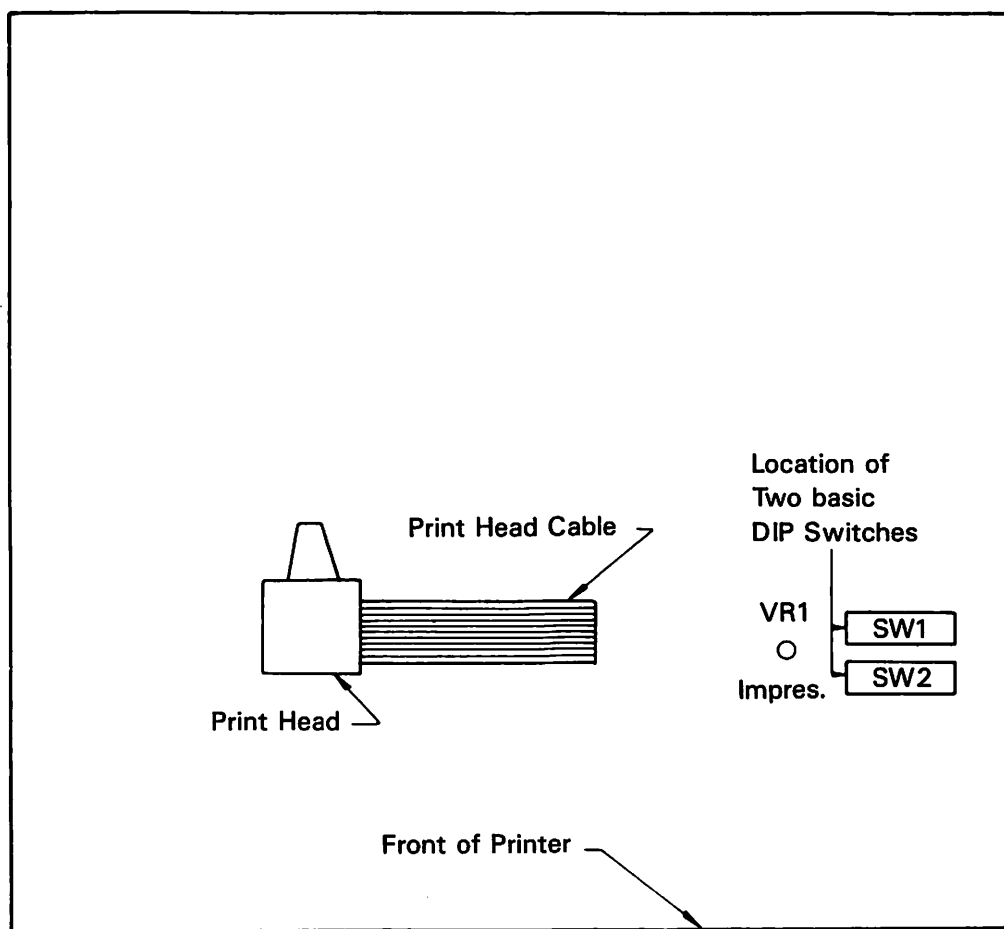


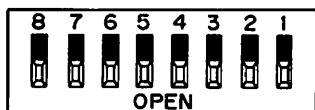
Fig. 3-1

Note: DIP Swtiches SW21, SW22 and SW23 are not installed on the C-210/15XP version (Parallel Interface Printer).

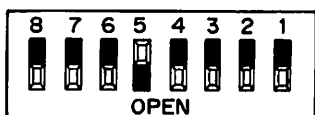
### 3.1.1 Factory Setting of DIP Switches

Parallel Interface (C-210/15XP)

3



SW1

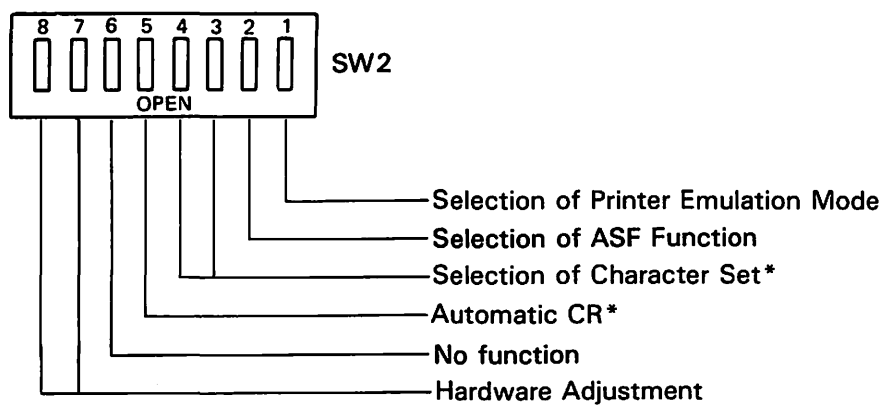
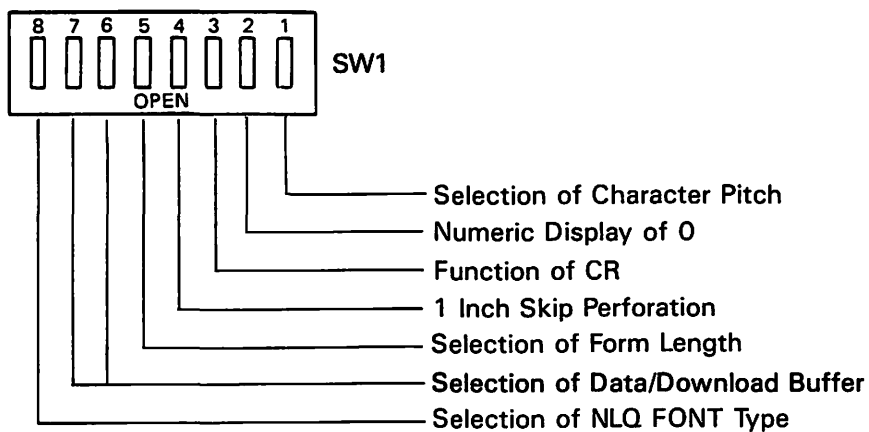


SW2

### 3.1.2 DIP Switch Setting

Various selections that can be made by the C-210/15XP DIP switches are shown below.

Basic Switches



\* DIP Switch setting in EPSON mode is as follows.

Foreign Character Set    2-3 ~ 2-6



**(1) DIP Switch Setting 1 (Basic Switches)**

DIP SW No.	Function	Open	Closed
1-1	Character Pitch	Pica (10 CPI)	Compressed (17.1 CPI)
1-2	Numeric Display of 0	0	Ø
1-3	CR Function	CR	CR + LF
1-4	1 Inch Skip Perforation	Invalid	Valid
1-5	Form Length	11 Inches	12 Inches
1-6 } 1-7 }	Data/Download Buffer	See table 3-2.	
1-8	NLQ FONT Type	NLQ 1 Mode (CG Type)	NLQ 2 Mode (Algorithm Type)
2-1	Printer Emulation Mode	IBM Mode	EPSON Mode
2-2	ASF	Detached	Attached
*IBM Mode			
2-3 } 2-4 }	Character Set	Refer to Table 3-3	
2-5	Automatic CR	Valid	Invalid
2-6	No Function		
*EPSON Mode			
2-3 } 2-4 } 2-5 } 2-6 }	Foreign Character Selection	Refer to Table 3-4	

**Table 3-1**

## Expanded CG RAM

DIP SW No.		Function	Standard
1-7	1-6		
Open	Open	Data Buffer	10K (N Line Buffer)
		Download Buffer	—
Open	Close	Data Buffer	4K (N Line Buffer)
		Download Buffer	6K (*1)
Close	Open	Data Buffer	2K (N Line Buffer)
		Download Buffer	8K (*2)
Close	Close	Data Buffer	1K (1 Line Buffer)
		Download Buffer	9K (*3)

**Table 3-2**

Note: Code (20) H and (A0) H can't be used in IBM-Mode.

(\*1) . . . DP 95 chars. and NLQ 95 chars.

(\*2) . . . DP 128 chars. or NLQ 128 chars.

(\*3) . . . DP 128 chars. and NLQ 128 chars.

95 chars; 32~126, (20) H~(7E) H

128 chars; 32~126, (20) H~(7E) H

160~192, (A0) H~(C0) H

**Character Set Selection (IBM mode)**  
The IBM character setting can be performed by setting the DIP switches according to the following table:

Character	SW2-4	SW2-3
(Set 1)/Set 2	Open	Open
Set 1/(Set 2)	Open	Close
(Set 1)/Set 2'	Close	Open
Set 1/(Set 2')	Close	Close

( ) . . . Selected when the power is turned on or the printer is reset.

**Table 3-3**

**Foreign Character Selection (EPSON mode)**  
The desired Foreign Character setting can be performed by setting the DIP switches according to the following table:

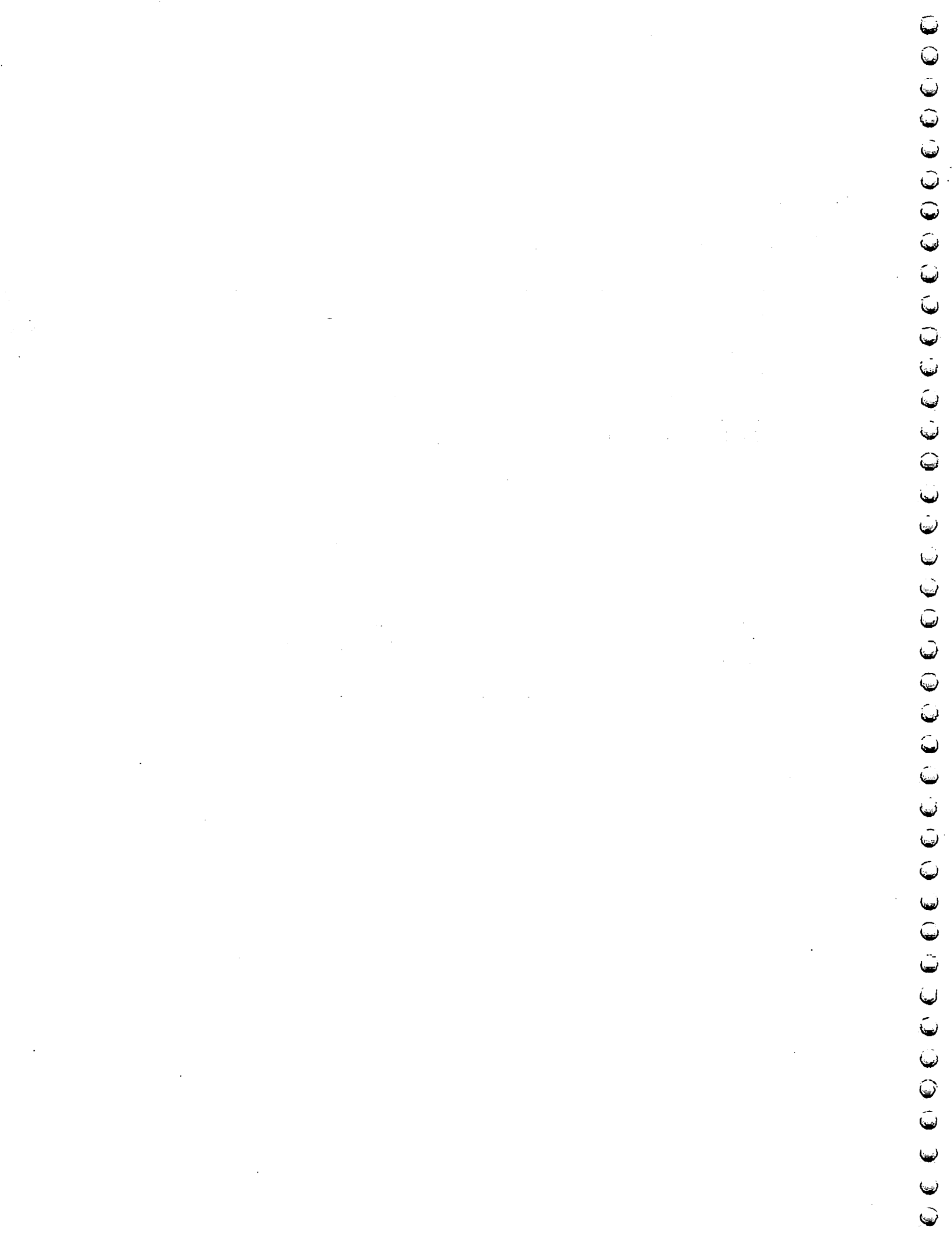
Country	SW2-6	SW2-5	SW2-4	SW2-3
JA (Japanese)	Open	Open	Open	Open
FR (French)	Open	Open	Open	Closed
USA (American)	Open	Open	Closed	Open
UK (British)	Open	Open	Closed	Closed
GE (German)	Open	Closed	Open	Open
SW (Swedish)	Open	Closed	Open	Closed
IT (Italian)	Open	Closed	Closed	Open
SP (Spanish)	Open	Closed	Closed	Closed
DN (Danish)	Closed	Open	Open	Open
NOR (Norwegian)	Closed	Open	Open	Closed
DU (Dutch)	Closed	Open	Closed	Open
AF (Afrikaans)	Closed	Open	Closed	Open
DN2 (Danish 2)	Closed	Closed	Open	Open
FRC (French Canadian)	Closed	Closed	Open	Closed
FR2 (French 2)	Closed	Closed	Closed	Open
UK2 (British 2)	Closed	Closed	Closed	Closed

**Table 3-4**

### 3.1.3 Printer Default Condition

The default conditions (factory settings) are as follows:

Item	Content
Form Length	11 Inches
7 or 8 bit	8 bit
Character Pitch	Pica
Function of CR	CR only
Selection of Buffer	N Line Buffer
A.S.F. Control (8510 only)	DETACHED
Numeric zero	0
Print Direction	Bi-directional
Paper Feed Direction	Forward
Line Spacing	1/6 "
HT Set	Every 8 columns
VT Set	No VT Setting
Emulation Mode	IBM mode
1 Inch Skip Perforation	Invalid
Data/Download Buffer	Data Buffer
NLQ Font	NLQ1 MODE (CG Type)
Character Set	(Set 1)/Set 2
Automatic CR	Invalid



# **CHAPTER 4.1**

## **IBM MODE**



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## 4.1.1 Understanding The Code Explanations

---

### UNDERSTANDING THE CODE EXPLANATIONS

Although the following explanations are designed to be simple and to convey as much useful information as possible, some concepts such as how to use parameters may not be clear to users who are new to computers and printers. Therefore this short explanation is included to prepare you for the chapters that follow.

#### Page Design

Most of the command explanations take up one complete page. In cases where commands are similar or related, there may be two or even three explanations per page. In still other cases, one complex command may take up two or more pages. But to keep everything as understandable as possible, most of the command explanations are broken down in the following way.

#### Top of Page

At the very top, left corner of the page is the command. To the right is a short description. A little below are the command and if necessary, its parameters. Here, the corresponding hexadecimal and decimal values are given. Still below, is a short but detailed explanation of the command and its parameters.

#### Middle of Page

If necessary, the **DIP-SW** label which includes the numbers of the DIP switches that may affect the command is listed.

The **Format** label which includes how the command is sent to your printer is listed. The BASIC language and decimal values are used here. But BE CAREFUL! To save space, the parameters aren't printed in the format that you will use when they are to be sent to your printer. The proper format is fully explained in "USING PARAMETERS" which soon follows.

#### Bottom of Page

The **Example** label is listed. This includes a short explanation of a following BASIC program. A little below this is the BASIC program which can be used to show you how to operate your printer. If you want to use it, type it in exactly as shown. A little below the BASIC program is a printout of what you should see when the program is run. To insure correct results when this program is run, make sure that the DIP-SW settings of your printer are set according to factory specifications. If your printer doesn't perform as expected, make sure that you have typed the program correctly.



## USING PARAMETERS

When controlling your printer, there may be some variable information that your printer needs in order to perform correctly. For example; how does your printer know how much of the following data will be printed as graphics instead of alphanumeric characters? It doesn't. Therefore you must tell your printer. And you do this by following certain commands with parameters. By using parameters, you can tell your printer how many 1/72" increments to feed the paper or you can tell your printer that the following number of data should be used for graphics. In any case, the parameters used in this manual have been broken down into the following types:

### FORMAT IN EXPLANATIONS

#### TYPE A

Single parameters. Usually used when passing one type of information. Used only once per command.

(n)

#### TYPE B

Same as TYPE A but used when TYPE C parameters are to be included within the same command.

(m)

#### TYPE C

Multiple parameters. Used to specify the amount of data that will be used with the command.

(n1 n2) or  
(n1 n2 n3) or  
(n1 n2 n3 n4)

Also used to specify a continuing stream of information with nn representing the last unit of information.

(n1 n2 ... nn) or  
(n1 n2 n3 ... nn)

#### TYPE D

Data series parameters. Each element of the parameter represents one unit or one byte of a continuing stream of data. With dn representing the last unit of data.

(d1 d2 d3 ... dn)

## TYPE E

Parameters that can't be classified. These are thoroughly explained when used.

(q) or (c) or (c1)

Notice that the same types of parameters are always enclosed as a group within one set of parenthesis instead of being separately enclosed.

Throughout this manual you will find many cases where commands must include or be followed by parameters. Depending on the needs of the commands, the ways that parameters must be calculated differ. Therefore parameter calculation is explained along with the corresponding commands. However, once the value for a parameter is known, it is sent by using the `CHR$( )` function of the BASIC language. Each element of every parameter must be sent with its own `CHR$( )` statement. The proper BASIC language format for each command is always shown next to the **Format** label under each command explanation, but the parameters aren't shown as they are actually sent. This is to save space because some commands require many parameter elements. Keep this fact in mind when using this manual and if you aren't sure how to send a command with its parameters, refer to the examples below that show how a command appears next to the **Format** label and how the command is actually sent.

4.1

---

ESC J                      — n/216" Line Feed Command —                      n = 48

**Format**                      LPRINT CHR\$(27); "J"; (n);

HOW IT IS SENT:

LPRINT CHR\$(27); "J"; CHR(48);

---

ESC K                      — Bit Image Graphics Command —                      n1 = 244, n2 = 1, d1 = 10,  
d2 = 20, d3 = 255, dn = 170

**Format**                      LPRINT CHR\$(27); "K"; (n1 n2) (d1 d2 d3 ... dn);

HOW IT IS SENT:

LPRINT CHR\$(27); "K"; CHR\$(244); CHR\$(1); CHR\$(10); CHR\$(20); CHR\$(255); CHR\$(170);

---

---

## 4.1.2 Function Codes

---

This printer performs printing according to the printing data from the host computer. However, print data only, does not allow the printer to fully perform all its functions. Besides print data, the function codes are used to select various printer functions.

Code Name	Hex. Code	Dec. Code	Function	Ref. Page
BS	08	8	Backspace	4-5
HT	09	9	Horizontal Tabulation	4-6
LF	0A	10	Line Feed	4-7
VT	0B	11	Vertical Tabulation	4-8
FF	0C	12	Form Feed	4-9
CR	0D	13	Carriage Return	4-11
SO	0E	14	Select Double Width Characters	4-12
SI	0F	15	Select Condensed Characters	4-13
DC1	11	17	Select Printer	4-14
DC2	12	18	Clear Condensed Characters	4-13
DC4	14	20	Clear Double Width Characters	4-12
CAN	18	24	Cancel	4-15
ESC	1B	27	Escape	4-16

The print samples are printed out on condition that all DIP-Switches are factory default selected.

**BS****Hex. code****08****Dec. code****8**

This code moves the carriage one character space to the left in the current character pitch.

When the printer receives this code continuously, backspacing will be performed continuously the number of times that this code has been received.

**Format**

4.1

**BS****LPRINT CHR\$ (8);****Example**

Print “~” over “a” using the BS code.

1. Print “a”.
2. Send BS code and print “~”.

**«Sample Program»**

```
10 LPRINT "a";CHR$(8);"~"
```

**«Printing»**

a~

### HT

Hex. code

09

Dec. code

9

This code moves the carriage position to the horizontal tab position set at power on or to predetermined horizontal tab positions that have been set by sending the Horizontal Tab Set code (refer to page 4-35).

When no tab is set to the right (from the current dot position), or if all tabs are cleared, this code is ignored.

4.1

#### Format

HT

**LPRINT CHR\$(9);**

#### Example

1. Print "AAA".
  2. Send one HT code and print "BBB".
  3. Send one HT code and print "CCC".
  4. Send two HT codes and print "DDD".
- (When the printer is powered up, tabs are automatically set every 8 columns.)

#### «Sample Program»

```
10 LPRINT "12345678901234567890
      12345678901234567890"
20 LPRINT "AAA";CHR$(9);"BBB";CHR$(9);"CCC";
      CHR$(9);CHR$(9);"DDD"
```

#### «Printing»

```
1234567890123456789012345678901234567890
AAA      BBB      CCC      DDD
```

### LF

**Hex. code**

**0A**

**Dec. code**

**10**

This code executes a single line feed.

### DIP-SW

**DIP-SW No. 2-5**

### Format

**LF**

**LPRINT CHR\$ (10);**

4.1

### Example

Print "AAA", "BBB", "CCC", and "DDD" with line feeding.

### «Sample Program»

```
10 LPRINT "AAA"CHR$(10);"BBB";CHR$(10);
   "CCC";CHR$(10);"DDD"
```

### «Printing»

```
AAA
  BBB
    CCC
      DDD
```

	<b>VT</b>
<b>Hex. code</b>	<b>0B</b>
<b>Dec. code</b>	<b>11</b>

This code moves the carriage to predetermined vertical tab positions which have been set by ESC B. At power on, no vertical tabs are set (refer to page 4-33, 4-34). When no vertical tabs are set, the paper is fed a single line.

### DIP-SW

DIP-SW No. 2-5

### Format

**VT** **LPRINT CHR\$ (11);**

### Example

Use ESC B to set vertical tabs at the 6th, 12th, 18th, 24th and 30th lines. Then print "AAA", send one VT code and print "BBB". Send another VT code and print "CCC". Send two more VT codes and print "DDD".

### «Sample Program»

```
10 LPRINT CHR$(27);"B";CHR$(6);CHR$(12);CHR$(18)
    ;CHR$(24);CHR$(30);CHR$(0);
20 LPRINT "AAA";CHR$(11);"BBB";CHR$(11);"CCC"
    ;CHR$(11);CHR$(11);"DDD"
```

### «Printing»

AAA

BBB

CCC

DDD

# FF

## Form Feed

**FF**

**Hex. code**

**0C**

**Dec. code**

**12**

This code feeds paper for one page.  
When the FF code is received, it feeds the paper to next top of form position  
(the first line of the page).

**DIP-SW**

**DIP-SW No. 1-5**

4.1

**Format**

**FF**

**LPRINT CHR\$(12);**

**Example**

Print "TOF" then send the FF code to print "TOF". (DIP-SW No. 1-5 OPEN)



«Sample Program»

```
10 LPRINT "___ TOF ___";CHR$(12)
20 LPRINT "___ TOF ___"
```

«Printing»

\_\_\_ TOF \_\_\_

\_\_\_ TOF \_\_\_

### CR

Hex. code

0D

Dec. code

13

This code moves the next printing position to the left margin position.

#### DIP-SW

DIP-SW No. 1-3

#### Format

CR

LPRINT CHR\$(13);

#### Example

Print "AAAAAAAAAA" by sending the CR code.

Print "BBBBBBBBBB" and "CCCCCCCCCC" by sending the CR code.

Print "DDDDDDDDDD" by sending the CR code.

#### «Sample Program»

```
10 LPRINT "AAAAAAAAAA";CHR$(13);CHR$(10);
20 LPRINT "BBBBBBBBBB";
30 LPRINT "CCCCCCCCCC";CHR$(13);CHR$(10);
40 LPRINT "DDDDDDDDDD"
```

#### «Printing»

```
AAAAAAAAAA
BBBBBBBBBBCCCCCCCCCC
DDDDDDDDDD
```

# SO DC4

## Select/Clear Double Width Characters

	SO	DC4
Hex. code	0E	14
Dec. code	14	20

The SO code sets the double width character mode and elongates the subsequent characters. The DC4 code clears the double width character mode. The SO code is also cleared by CR, CAN, LF, FF, VT, ESC W0.

4.1

### Format

SO                    **LPRINT CHR\$ (14);**

DC4                   **LPRINT CHR\$ (20);**

### Example

After printing "ABC", send the SO code, print "DEF", send the DC4 code, and print "GHI".

«Sample Program»            **10 LPRINT "ABC" ;CHR\$(14) ;"DEF" ;CHR\$(20) ;"GHI"**

«Printing»                    **ABCDEF GHI**

# SI DC2

## Select/Clear Condensed Characters

	SI	DC2
Hex. code	0F	12
Dec. code	15	18

The SI code sets the condensed character mode which condenses the subsequent characters. The DC2 code clears the condensed character mode to set 10 CPI (pica pitch).

The DC2 code also clears the elite character mode (ESC :) to set 10 CPI. The SI code can also be sent as ESC SI (27 15).

4.1

### DIP-SW

DIP-SW No. 1-1

### Format

SI

LPRINT CHR\$(15);

DC2

LPRINT CHR\$(18);

### Example

After printing "ABC", send the SI code, print "DEF", send the DC2 code, and print "GHI"

### «Sample Program»

```
10 LPRINT "ABC";CHR$(15);"DEF";CHR$(18);"GHI"
```

### «Printing»

ABCDEFGHI

# DC1

Select Printer

## DC1

Hex. code                      11

Dec. code                      17

The DC1 code is used to select the printer after it has been deselected by ESC Q3.

### Format

DC1                      LPRINT CHR\$ (17);

4.1

**CAN****Hex. code****18****Dec. code****24**

All print data following the last print command and preceding the CAN code are canceled. The SO code is also canceled but other function codes aren't affected.

**Format****CAN****LPRINT CHR\$ (24);**

4.1

**Example**

Send "ABC", send the CAN code, then send "DEF".

**«Sample Program»****10 LPRINT "ABC" ;CHR\$(24) ;"DEF"****«Printing»****DEF**

# ESC

Escape

## ESC

Hex. code

1B

Dec. code

27

This code is for starting expanded function codes. This code is used in combination with other codes.

### Format

ESC

LPRINT CHR\$ (27);

## 4.1.3 Expanded Function Codes

The expanded function codes are multi-byte control codes.

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Print Direction	ESC U NUL	1B 55 00	27 85 0	Bidirectional	4-19
	ESC U SOH	1B 55 01	27 85 1	Unidirectional	4-19
Print Quality	ESC I NUL	1B 49 00	27 73 0	DP Mode	4-20
	ESC I STX* <sup>1</sup>	1B 49 02	27 73 2	NLQ Mode	4-20
Character Pitch	ESC :	1B 3A	27 58	12 CPI (Elite)	4-21
	ESC SI	1B 0F	27 15	17.1 CPI (Condensed)	4-21
Line Feed	ESC J	1B 4A	27 74	Select n/216 line feed	4-22
	ESC 5 SOH	1B 35 01	27 53 1	Select automatic line feed	4-23
	ESC 5 NUL	1B 35 00	27 53 0	Clear automatic line feed	4-23
	ESC I	1B 5D	27 93	Select reverse line feed	4-24
	ESC 2* <sup>2</sup>	1B 32	27 50	Set 1/6" line feed	4-25
	ESC 0	1B 30	27 48	Set 1/8" line feed	4-25
	ESC 1	1B 31	27 49	Set 7/72" line feed	4-25
	ESC A	1B 41	27 65	Store n/72" line feed	4-26
	ESC 3	1B 33	27 51	Set n/216 line feed	4-27

NOTE: \*1 According to the selection of DIP-SW 1-8, either CG Type NLQ or Algorithm Type NLQ is selected.

\*2 Line feed pitch becomes different according to the setting of ESC A.



	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Page Length Set	ESC C	1B 43	27 67	Set page length (lines)	4-28
	ESC C NUL	1B 43 00	27 67 0	Set page length (inches)	4-29
	ESC 4	1B 34	27 52	Set TOF	4-37
Skip Perforation	ESC N	1B 4E	27 78	Skip (n) lines	4-31
	ESC O	1B 4F	27 79	Clear skip perforation	4-31
Vertical Tab	ESC B	1B 42	27 66	Set vertical tabs	4-33
Horizontal Tab	ESC D	1B 44	27 68	Set horizontal tabs	4-35
Initialize	ESC R	1B 52	27 82	Initialize Tabs	4-36
Bit Image Graphic Mode	ESC K	1B 4B	27 75	60 DPI	4-38
	ESC L	1B 4C	27 76	120 DPI	4-40
	ESC Y	1B 59	27 89	120 DPI (Half)	4-40
	ESC Z	1B 5A	27 90	240 DPI (Half)	4-40
Download	ESC I EOT	1B 49 04	27 73 4	DP download Character Select	4-41
	ESC I ACK	1B 49 06	27 73 6	NLO download Character Select	4-41
	ESC =	1B 3D	27 61	Define download characters	4-42
Character Set	ESC 7	1B 37	27 55	Character Set 1	4-48
	ESC 6	1B 36	27 54	Character Set 2	4-48
All Characters Print Mode	ESC \	1B 5C	27 92	Select All Characters Print Mode 1	4-49
	ESC ^	1B 5E	27 94	Select All Characters Print Mode 2	4-50
Home Head	ESC <	1B 3C	27 60	Home Head	4-51

# ESC U NUL ESC U SOH

Select Print Direction

	ESC U NUL			ESC U SOH		
Hex. code	1B	55	00	1B	55	01
Dec. code	27	85	0	27	85	1

The ESC U NUL code selects bidirectional print, and the ESC U SOH code selects unidirectional print.

## Format

ESC U NUL

LPRINT CHR\$ (27); "U"; CHR\$ (0);

ESC U SOH

LPRINT CHR\$ (27); "U"; CHR\$ (1);

4.1

# ESC I NUL ESC I STX

Select Print Quality

	ESC I NUL			ESC I STX		
Hex. code	1B	49	00	1B	49	02
Dec. code	27	73	0	27	73	2

These codes select print quality. The ESC I NUL code selects DP (Data Processing) mode, and the ESC I STX code selects NLQ (Near Letter Quality) mode.

4.1

## DIP-SW

DIP-SW No. 1-8

## Format

ESC I NUL

LPRINT CHR\$(27); "I"; CHR\$(0);

ESC I STX

LPRINT CHR\$(27); "I"; CHR\$(2);

## Example

Print the alphabet in DP and NLQ1 mode with DIP SW 1-8 open and then print the alphabet in DP and NLQ2 mode again, but with DIP SW 1-8 closed.

## «Sample Program»

```
10 LPRINT CHR$(27); "I"; CHR$(0);
   "ABCDEFGH IJKLMNOPQRSTUVWXYZ"
20 LPRINT CHR$(27); "I"; CHR$(2);
   "ABCDEFGH IJKLMNOPQRSTUVWXYZ"
```

With DIP SW 1-8 open. NLQ1 MODE

## «Printing»

```
ABCDEFGH IJKLMNOPQRSTUVWXYZ
ABCDEFGH IJKLMNOPQRSTUVWXYZ
```

With DIP SW 1-8 closed. NLQ2 MODE

```
ABCDEFGH IJKLMNOPQRSTUVWXYZ
ABCDEFGH IJKLMNOPQRSTUVWXYZ
```

ESC :  
ESC SI

Select Character Pitch

	ESC :	ESC SI
Hex. code	1B 3A	1B 0F
Dec. code	27 58	27 15

These codes select character pitch. The ESC : code selects 12 CPI (elite pitch), and the ESC SI code selects 17.1 CPI (condensed pitch). Function code DC2 (refer to page 4-13) sets 10 CPI (pica pitch).

4.1

Format

ESC :                   LPRINT CHR\$ (27); “.”;

ESC SI                   LPRINT CHR\$ (27); CHR\$ (15);

Example

Print A to N by using ESC : and ESC SI, respectively.

«Sample Program»

```
10 LPRINT CHR$(27);".";"ABCDEFGH IJKLMN"  
20 LPRINT CHR$(27);CHR$(15);"ABCDEFGH IJKLMN"
```

«Printing»

```
ABCDEFGH IJKLMN  
ABCDEFGH IJKLMN
```

### ESC J (n)

Hex. code

1B 4A (n)

Dec. code

27 74 (n)

This line feed command causes an  $n/216$ " line feed according to the value of (n). (n) should be in the range of 1 to 255.

The data preceding this code is printed out. On completing this line feed, this code is canceled. (Each reception of this code corresponds to each movement.)

4.1

#### DIP-SW

DIP-SW No. 2-5

#### Format

ESC J

LPRINT CHR\$(27); "J"; (n);

#### Example

Print "H" with (n) set to 16, 32, and 64, respectively.

#### «Sample Program»

```
10 LPRINT "HHHHHHHHHH"CHR$(27); "J";CHR$(16);
20 LPRINT "HHHHHHHHHH"CHR$(27); "J";CHR$(32);
30 LPRINT "HHHHHHHHHH"CHR$(27); "J";CHR$(64);
40 LPRINT "HHHHHHHHHH";
```

#### «Printing»

```
HHHHHHHHHH  HHHHHHHHHH
                HHHHHHHHHH
                        HHHHHHHHHH
```

# ESC 5 SOH ESC 5 NUL

## Select/Clear Automatic Line Feed

	ESC 5 SOH	ESC 5 NUL
Hex. code	1B 35 01	1B 35 00
Dec. code	27 53 1	27 53 0

These codes select or clear automatic line feed. Automatic line feed causes line feed to take place after printing is performed by function code CR (refer to page 4-11). The ESC 5 SOH code causes carriage return and line feed, and the ESC 5 NUL code causes carriage return only.

4.1

### Format

ESC 5 SOH

LPRINT CHR\$(27); "5"; CHR\$(1);

ESC 5 NUL

LPRINT CHR\$(27); "5"; CHR\$(0);

### Example

Print "OOOOO", followed by carriage return and line feed, and print "+++++".  
Print "OOOOO", followed by carriage return only, and print "+++++".

### «Sample Program»

```
10 LPRINT CHR$(27); "5"; CHR$(1); "OOOOO"; CHR$(13);
20 LPRINT "+++++"
30 LPRINT CHR$(27); "5"; CHR$(0); "OOOOO"; CHR$(13);
40 LPRINT "+++++"

```

### «Printing»

```
OOOOO
+++++

OOOOO

```

# ESC ]

## Reverse Line Feed

### ESC ]

Hex. code	1B	5D
Dec. code	27	93

Reception of this code causes a single reverse line feed to be performed in the current line feed pitch.

Note: Be sure to confirm that the printer is set in the friction feed or the push tractor feed position before sending the ESC ] code.

4.1

#### Format

ESC ]                      LPRINT CHR\$(27); "]" ;

#### Example

Print "A" to "C" while performing forward line feed, and print "D" above "A" after performing reverse line feed.

#### «Sample Program»

```
10 LPRINT "AAAAA"
20 LPRINT "BBBBB"
30 LPRINT "CCCCC" ;
40 LPRINT CHR$(27); "]" ; CHR$(27); "]" ; CHR$(27);
   "]" ; CHR$(27); "]"
50 LPRINT "DDDDD"
```

#### «Printing»

```
DDDDD
AAAAA
BBBBB
CCCCC
```

ESC 2  
ESC 0    ESC 1

Select Line Feed Spacing

	ESC 2	ESC 0	ESC 1
Hex. code	1B 32	1B 30	1B 31
Dec. code	27 50	27 48	27 49

ESC 2 activates the last line spacing that has been stored by the ESC A code (see page 4-26).  
If no ESC A code has been previously received then ESC 2 selects 1/6" line spacing.  
ESC 0 selects 1/8" line spacing.  
ESC 1 selects 7/72" line spacing.

4.1

Format

ESC 2	LPRINT CHR\$ (27); "2";
ESC 0	LPRINT CHR\$ (27); "0";
ESC 1	LPRINT CHR\$ (27); "1";

Example

Print "ABCDEFGH" while performing line feeds with line spacings of 1/6", 1/8" and 7/72".

«Sample Program»

```
10 LPRINT "ABCDEFGH";CHR$(27);"2"  
20 LPRINT "ABCDEFGH";CHR$(27);"0"  
30 LPRINT "ABCDEFGH";CHR$(27);"1"  
40 LPRINT "ABCDEFGH"
```

«Printing»

```
ABCDEFGH  
ABCDEFGH  
ABCDEFGH  
ABCDEFGH
```



# ESC A

Store  $n/72''$  Line Feed

## ESC A (n)

Hex. code            1B   41   (n)

Dec. code           27   65   (n)

This code stores a line spacing of  $n/72''$  and  $n$  should be in the range of 1 to 85. The line spacing stored by this code does not become effective until the ESC 2 code (activate ESC A spacing) is received. Also, every succeeding change in spacing stored by ESC A must again be activated by ESC 2.

4.1

### Format

ESC A                    LPRINT CHR\$(27); "A"; (n);

### Example

Print "ABCDEFGH" with (n) set to 6, 12 and 24 respectively.

### «Sample Program»

```
10 LPRINT "ABCDEFGH";CHR$(27);"A";CHR$(6);  
   CHR$(27);"2"  
20 LPRINT "ABCDEFGH";CHR$(27);"A";CHR$(12);  
   CHR$(27);"2"  
30 LPRINT "ABCDEFGH";CHR$(27);"A";CHR$(24);  
   CHR$(27);"2"  
40 LPRINT "ABCDEFGH"
```

### «Printing»

```
ABCDEFGH  
ABCDEFGH  
  
ABCDEFGH
```

### ESC 3 (n)

Hex. code

1B 33 (n)

Dec. code

27 51 (n)

This code sets a line spacing of  $n/216''$  according to the value of (n). (n) should be in the range of 1 to 255.

#### Format

ESC 3

LPRINT CHR\$(27); "3"; (n);

4.1

#### Example

Print "ABCDEFGH" with (n) set to 16, 32 and 64 respectively.

#### «Sample Program»

```
10 LPRINT "ABCDEFGH";CHR$(27);"3";CHR$(16)
20 LPRINT "ABCDEFGH";CHR$(27);"3";CHR$(32)
30 LPRINT "ABCDEFGH";CHR$(27);"3";CHR$(64)
40 LPRINT "ABCDEFGH"
```

#### «Printing»

```
ABCDEFH
ABCDEFH
ABCDEFH
```

### ESC C (n)

Hex. code

1B 43 (n)

Dec. code

27 67 (n)

This code sets page length. The number of lines is specified by the value of (n) which must be 1 ~ 127.

The overall page length depends on the current line feed pitch.

The position at which this command is used to set page length, becomes the TOF position. This command causes the skip perforation setting and vertical tab settings to be cleared.

#### Format

ESC C

LPRINT CHR\$(27); "C"; (n);

#### Example

Set page length to 10 lines. Print "—TOF—", feed the page by using the FF code (refer to page 4-10), and print "—TOF—" again.

#### «Sample Program»

```
10 LPRINT CHR$(27); "C"; CHR$(10);
20 LPRINT "____ TOF ____"; CHR$(13); CHR$(12);
30 LPRINT "____ TOF ____"
```

#### «Printing»

\_\_\_\_ TOF \_\_\_\_

\_\_\_\_ TOF \_\_\_\_

# ESC C NUL

Set Page Length (Inch)

	ESC C NUL (n)			
Hex. code	1B	43	00	(n)
Dec. code	27	67	0	(n)

This code sets page length. The page length in inches is specified by the value of (n) which must be 1~22.

The position at which this command is used to set page length, becomes the TOF position. This command causes the skip perforation setting and vertical tab settings to be cleared.

## Format

ESC C NUL

LPRINT CHR\$ (27); "C"; CHR\$ (0); (n);

4:1

**Example**

Set page length to 5 inches.

Print “—TOF—”, feed the page, and print “—TOF—” again.

**«Sample Program»**

```
10 LPRINT CHR$(27); "C"; CHR$(0); CHR$(5);  
20 LPRINT "____ TOF ____"; CHR$(13); CHR$(12);  
30 LPRINT "____ TOF ____"
```

**«Printing»**

\_\_\_\_ TOF \_\_\_\_

\_\_\_\_ TOF \_\_\_\_

ESC N  
ESC O

Set/Clear Skip Perforation Mode

	ESC N (n)	ESC O
Hex. code	1B 4E (n)	1B 4F
Dec. code	27 78 (n)	27 79

These codes set or clear the skip perforation function. This function provides space at the bottom of the page. The number of lines to skip is specified by (n). (n) is an integral number from 1 to 127. To set (n) to 10, code (0A) H or (10) is used. (The form length should be set longer than the number of lines to be skipped.) ESC O clears the skip perforation function.

4.1

DIP-SW

DIP-SW No. 1-4

Format

ESC N

LPRINT CHR\$ (27); "N"; (n);

ESC O

LPRINT CHR\$ (27); "O";

#### Example

Set page length to 8 lines by using ESC C (n). Set skip perforation to three lines by using ESC N (n). Continuously print "A". Then send the clear code and continuously print "A".

#### «Sample Program»

```
10 LPRINT CHR$(27);"C";CHR$(8);
20 LPRINT CHR$(27);"N";CHR$(3);
30 FOR I=1 TO 15
40 LPRINT "AAAAAAAAAA"
50 NEXT I
60 LPRINT CHR$(27);"O";
70 FOR N=1 TO 10
80 LPRINT "AAAAAAAAAA"
90 NEXT N
```

#### «Printing»

```
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
```

```
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
```

```
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
```

```
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
```

### ESC B (n1 n2 . . . nn) NUL

Hex. code	1B	42 (n1 n2 . . . nn)	00
Dec. code	27	66 (n1 n2 . . . nn)	0

The ESC B code sets vertical tab positions according to the subsequent n1 n2 to nn. The NUL code ends the setting of the vertical tabs. The tab setting should be performed from top to bottom. The ESC R code clears vertical tabs. Depending on the page length and line feed pitch, a maximum of 64 vertical tabs can be set. The ESC B NUL command when sent without parameters also clears all the vertical tabs.

#### Format

ESC B LPRINT CHR\$(27); "B"; (n1 n2 . . . nn); CHR\$(0);



**Example**

Set a tab stop on the 5th, 10th, and 15th lines and print "A" at the tab stops by using the VT code (refer to page 4-8).

**«Sample Program»**

```
10 LPRINT CHR$(27);"B";CHR$(5);CHR$(10);  
    CHR$(15);CHR$(0);  
20 FOR I=1 TO 20  
30 LPRINT I  
40 NEXT I  
50 FOR N=1 TO 20  
60 LPRINT CHR$(27);"I";  
70 NEXT N  
80 LPRINT "    AAA";CHR$(11);"AAA";CHR$(11);  
    "AAA";CHR$(11);"AAA"
```

**«Printing»**

```
1 AAA  
2  
3  
4  
5    AAA  
6  
7  
8  
9  
10    AAA  
11  
12  
13  
14  
15    AAA  
16  
17  
18  
19  
20
```

### ESC D (n1 n2 . . . nn) NUL

Hex. code	1B 44 (n1 n2 . . . nn) 00
Dec. code	27 68 (n1 n2 . . . nn) 0

This code sets or clears horizontal tabs. The ESC D code sets tab positions according to the subsequent n1 n2 to nn. The NUL code ends the setting of the horizontal tabs. The tab setting should be performed from left to right. The ESC R code initializes horizontal tabs. Tabs can be set every eight columns by initializing. Depending on the character pitch, a maximum of 32 horizontal tabs can be set per line. The ESC D NUL command clears all the horizontal tabs.

The range for the Horizontal tabs is as follows:

CPI	Range of n
10 CPI	n=1 ~ 80 (136)
12 CPI	n=1 ~ 96 (163)
17.1 CPI	n=1 ~ 137 (233)
Proportional	n=1 ~ 80 (136)

( ) = 15" Version

#### Format

ESC D LPRINT CHR\$(27); "D"; (n1 n2 . . . nn);

#### Example

Set a tab stop at the 5th, 10th, 15th and 20th characters and print "A" at the tab stops by using the HT code (refer to page 4-6).

#### «Sample Program»

```
10 LPRINT "123456789012345678901234567890"
20 LPRINT CHR$(27); "D"; CHR$(5); CHR$(10); CHR$(15);
    CHR$(20); CHR$(0);
30 LPRINT "A"; CHR$(9); "A"; CHR$(9); "A"; CHR$(9);
    "A"; CHR$(9); "A"
```

#### «Printing»

```
123456789012345678901234567890
A  A  A  A  A
```

### ESC R

Hex. code	<b>1B</b>	<b>52</b>
Dec. code	<b>27</b>	<b>82</b>

The ESC R code initializes both horizontal and vertical tabs — horizontal tabs are initialized to one tab at every eighth column beginning at the 9th column. All vertical tabs are cleared.

4.1

#### Format

ESC R                      **LPRINT CHR\$ (27); "R";**

### ESC 4

Hex. code            **1B   34**

Dec. code            **27   52**

This code sets the top of a page. The line where this code is received becomes the top of form (TOF).

#### Format

ESC 4                    **LPRINT CHR\$(27); "4";**

4.1

#### Example

Set page length to 10 lines by using the ESC C (n) code (refer to page 4-28). After printing five lines of "A", set the last printed line as the top of form. After feeding the page by using the FF code (refer to page 4-10), print "A" again.

#### «Sample Program»

```
10 LPRINT CHR$(27); "C"; CHR$(10);  
20 FOR I=1 TO 5  
30 LPRINT "AAAAA"  
40 NEXT I  
50 LPRINT CHR$(27); "4"; CHR$(12);  
60 LPRINT "AAAAA"
```

#### «Printing»

```
AAAAA  
AAAAA  
AAAAA  
AAAAA  
AAAAA
```

AAAAA

# ESC K

## Select 60 DPI Bit Image Graphic Mode

### ESC K (n1 n2) (d1 d2 d3 . . . dn)

Hex. code	1B 4B (n1 n2) (d1 d2 d3 . . . dn)
Dec. code	27 75 (n1 n2) (d1 d2 d3 . . . dn)

The ESC K code selects 60 DPI bit image graphic mode which provides 8 dots per column. The number of bytes to be printed as bit image data is specified by n1n2 and the actual data bytes are represented by d1d2d3 ... dn. The data length setting method is described below.

- ① When the data length is 255 bytes or fewer, n2 is 0. Set the data length in n1.

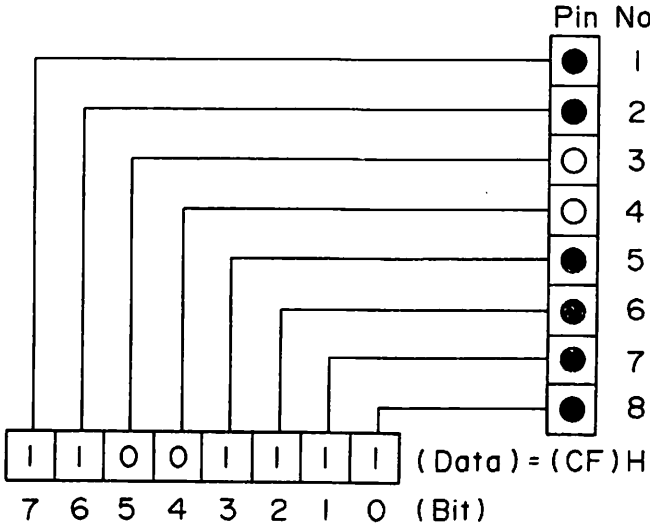
**Example** When the data length is 20 bytes:  
n1=20  
n2=0

- ② When the data length is 256 bytes or more, the result (discard the figures below the decimal point) obtained by dividing the data length by 256 bytes is put in n2, and the remainder in n1.

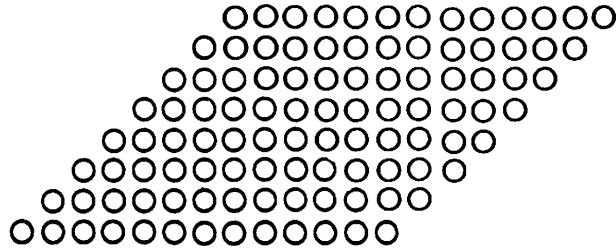
**Example** When the data length is 300 bytes:

$$\begin{array}{r} 1 \dots n2 \\ 256 \overline{) 300} \\ \underline{256} \\ 44 \dots n1 \end{array}$$

The bits of each data byte correspond to the head pins as shown below:



The data setting method is as shown below.



4.1

#### Format

ESC K

LPRINT CHR\$(27); "K"; (n1 n2) (d1 d2 d3 . . . dn);

#### Example

Specify dot columns for 20 bytes. Then, print as shown below.

#### «Sample Program»

```
10 LPRINT CHR$(27); "K"; CHR$(20); CHR$(0);  
20 LPRINT CHR$(1); CHR$(3); CHR$(7); CHR$(15);  
   CHR$(31); CHR$(63); CHR$(127);  
30 LPRINT STRING$(6,255);  
40 LPRINT CHR$(254); CHR$(252); CHR$(248); CHR$(240);  
   CHR$(224); CHR$(192); CHR$(128)
```

#### «Printing»



**ESC L**  
**ESC Y    ESC Z**

Select 120/120 (Half)/240 DPI Bit  
Image Graphic Modes

	<b>ESC L</b>	(n1 n2) (d1 d2 d3 . . . dn)
Hex. code	1B 4C	(n1 n2) (d1 d2 d3 . . . dn)
Dec. code	27 76	(n1 n2) (d1 d2 d3 . . . dn)

	<b>ESC Y</b>	(n1 n2) (d1 d2 d3 . . . dn)
Hex. code	1B 59	(n1 n2) (d1 d2 d3 . . . dn)
Dec. code	27 89	(n1 n2) (d1 d2 d3 . . . dn)

	<b>ESC Z</b>	(n1 n2) (d1 d2 d3 . . . dn)
Hex. code	1B 5A	(n1 n2) (d1 d2 d3 . . . dn)
Dec. code	27 90	(n1 n2) (d1 d2 d3 . . . dn)

These codes are bit image graphic codes providing 8 bits per dot column. The horizontal pitches are as follows:

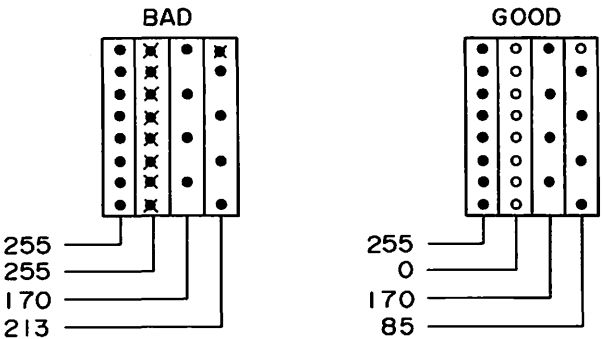
- ESC L . . . 120 DPI
- ESC Y . . . 120 DPI (Half)
- ESC Z . . . 240 DPI (Half)

The data length and data setting method are the same as the ESC K code (refer to page 4-38).

**Format**

<b>ESC L</b>	<b>LPRINT CHR\$ (27); "L"; (n1 n2) (d1 d2 d3 . . . dn);</b>
<b>ESC Y</b>	<b>LPRINT CHR\$ (27); "Y"; (n1 n2) (d1 d2 d3 . . . dn);</b>
<b>ESC Z</b>	<b>LPRINT CHR\$ (27); "Z"; (n1 n2) (d1 d2 d3 . . . dn);</b>

NOTE:  
ESC Y and ESC Z don't point horizontally adjacent dots. Therefore, the dots marked as '✕' can not be printed and should not be defined. This is shown in the illustration below.



**ESC I EOT**  
**ESC I ACK**

**Select Download Characters**

	ESC I EOT	ESC I ACK
Hex. code	1B 49 04	1B 49 06
Dec. code	27 73 4	27 73 6

These codes select the print quality when download characters are to be printed. The ESC I EOT code selects DP (Data Processing) mode and the ESC I ACK code selects NLQ (Near Letter Quality) mode. After download character printing is ended, select normal ROM characters by using the print quality select codes for normal mode.

4.1

**Format**

ESC I EOT	LPRINT CHR\$ (27); “I”; CHR\$ (4);
ESC I ACK	LPRINT CHR\$ (27); “I”; CHR\$ (6);



# ESC =

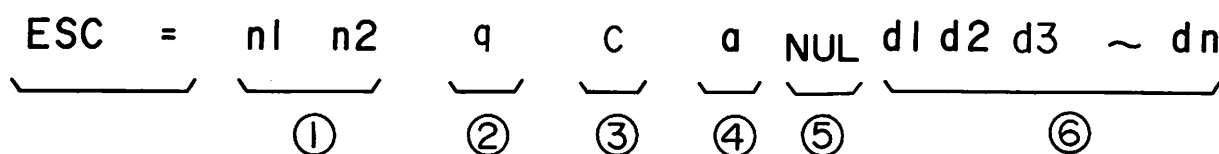
## Define Down Load Character Code

	<b>ESC =</b>
Hex. code	<b>1B 3D</b>
Dec. code	<b>27 61</b>

This code starts downloading. Download characters are defined by the following codes:

### NOTE:

Set DIP-SW 1-6 and 1-7 for download buffer condition to start downloading.



#### ① Data Length Setting (n1n2)

Set the length of download data:

To set data length in DP mode:

$$(\text{Data length}) = (\text{No. of characters}) \times (13) + (2)$$

In the case of fewer than 256 bytes of data, n2 is 0. Set data length in n1.

**Example** Set the number of characters to 2.

$$\text{Data length} = (2 \times 13) + 2 = 28$$

$$n1 = 28$$

$$n2 = 0$$

In the case of 256 bytes of data or more, put in n2 the result (omit the figures below the decimal point) obtained by dividing the data length by 256, and the remainder in n1.

**Example** Set the number of characters to 94.

$$\text{Data length} = (94 \times 13) + 2 = 1224$$

$$1224 / 256 = 4 \dots (\text{remainder} = 200)$$

$$n1 = 200$$

$$n2 = 4$$

To set data length in NLQ mode:

$$(\text{Data length}) = (\text{No. of characters}) \times (48) + (2)$$

The calculation method of n1n2 is the same as in DP mode.

#### ② Print Quality Setting (q)

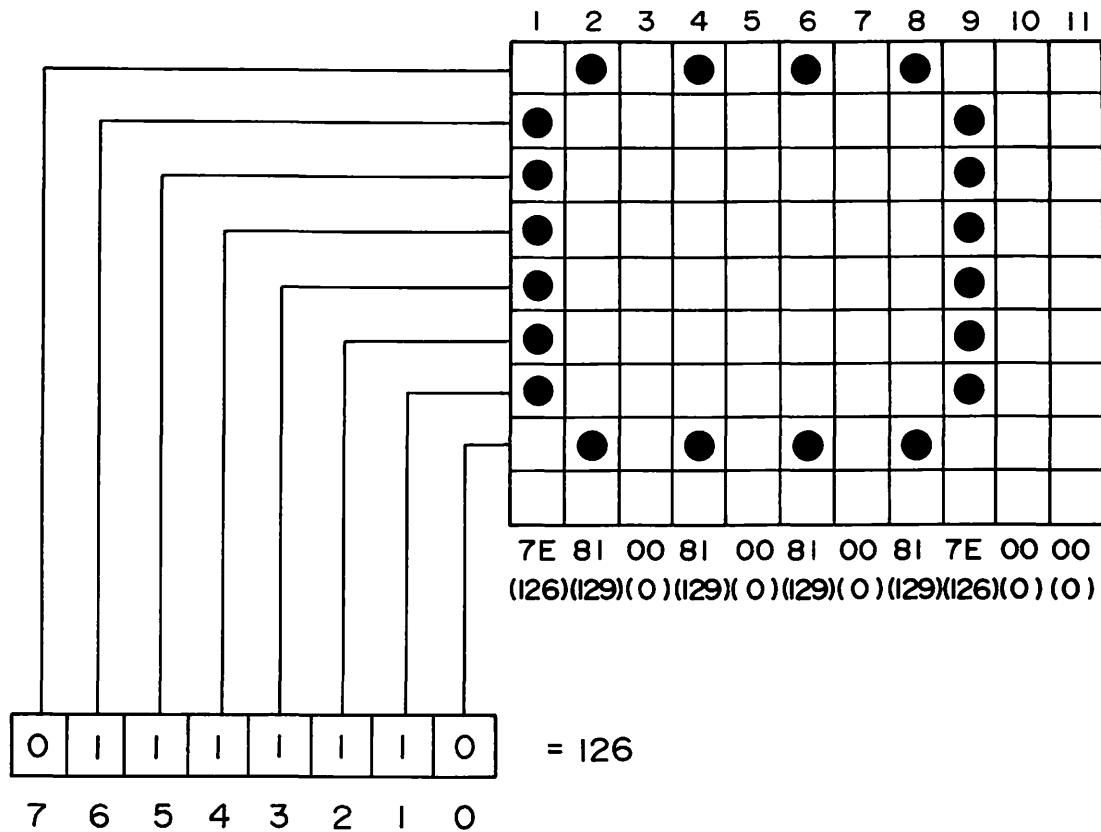
Set print quality:

(14) H or (20) selects DP mode, and (15) H or (21) selects NLQ mode.

- ③ Download Starting Address Code Setting (c)  
Set the download start address with 1 byte. For example, to download characters with codes starting with the ASCII code "A", c is (41) H or (65).
- ④ Type of Character Setting (a)  
To set a character requiring descending, such as "j" or "g", with 1 byte of data, (a) is (80) H or (128). If no descending is required, (a) is (00) H or (0).
- ⑤ Be sure to input the NUL code before the next step.
- ⑥ Data Setting  
In DP mode, data consisting of 11 bytes per character is entered. In NLQ mode, data consisting of 46 bytes per character is entered.
- ⑦ Repeat ④~⑥ procedures for each character that is downloaded.

**DIP-SW****DIP-SW No. 1-6, 1-7****Format****ESC =****LPRINT CHR\$ (27); "="; (n1 n2) (q) (c) (a) (0) (d1 d2 d3 . . . dn);****Example**

Design a character and find the byte value for each column as shown below. Take note that since horizontally adjacent dots can't be printed in Download mode, the character is defined by placing horizontal dots in every other column. In this case, a DP character is used.



After the values for the columns have been found, the following program downloads this character twice: the first time as a normal character (lines 140~170); and the second time as a descending character (lines 180~210). Line 140 sends a value which corresponds to a and which sets No (NUL) Descender. Line 180 also sends a value which corresponds to a (for the second character) and which sets a descender (80H).

«Sample Program»

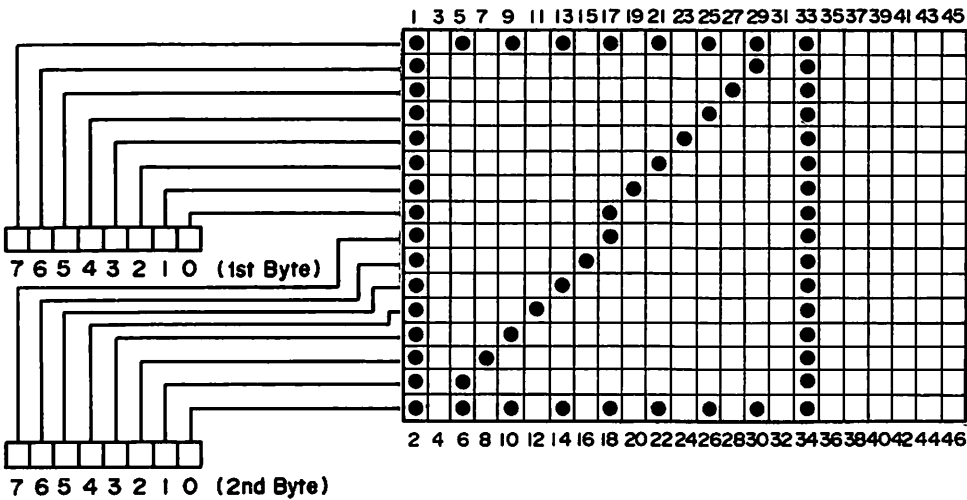
```
100 LPRINT CHR$(27); "=" ;  
110 LPRINT CHR$(15);CHR$(0);  
120 LPRINT CHR$(20);  
130 LPRINT "A";  
140 LPRINT CHR$(0);CHR$(0);  
150 LPRINT CHR$(126);CHR$(129);CHR$(0 );CHR$(129);  
160 LPRINT CHR$(0 );CHR$(129);CHR$(0 );CHR$(129);  
170 LPRINT CHR$(126);CHR$(0 );CHR$(0 );  
180 LPRINT CHR$(27);"I";CHR$(4);"AAAAAA"
```

«Printing»

000000

# Example

Define a character and find the byte value for each column as shown below. Take note that since horizontally adjacent dots can't be printed in Download mode, the character is defined by placing horizontal dots in every other column. In this case, a NLQ character is used.



As for NLQ mode, the number of vertical dots is 16.

Data is input in this order: the 1st upper byte then the 1st lower byte, the 2nd upper byte then the 2nd lower byte. This sequence is continued until the end of the downloaded character is reached.

«Sample Program»

```
100 LPRINT CHR$(27); "=" ;
110 LPRINT CHR$(50);CHR$(0) ;
120 LPRINT CHR$(21) ;
130 LPRINT "A";CHR$(0);CHR$(0) ;
140 LPRINT CHR$(255);CHR$(255);CHR$(0) ;CHR$(0) ;
150 LPRINT CHR$(128);CHR$(3) ;CHR$(0) ;CHR$(4) ;
160 LPRINT CHR$(128);CHR$(9) ;CHR$(0) ;CHR$(16) ;
170 LPRINT CHR$(128);CHR$(33) ;CHR$(0) ;CHR$(64) ;
180 LPRINT CHR$(129);CHR$(129);CHR$(2) ;CHR$(0) ;
190 LPRINT CHR$(132);CHR$(1) ;CHR$(8) ;CHR$(0) ;
200 LPRINT CHR$(144);CHR$(1) ;CHR$(32) ;CHR$(0) ;
210 LPRINT CHR$(192);CHR$(1) ;CHR$(0) ;CHR$(0) ;
220 LPRINT CHR$(255);CHR$(255);CHR$(0) ;CHR$(0) ;
230 LPRINT CHR$(0) ;CHR$(0) ;CHR$(0) ;CHR$(0) ;
240 LPRINT CHR$(0) ;CHR$(0) ;CHR$(0) ;CHR$(0) ;
250 LPRINT CHR$(0) ;CHR$(0) ;
260 LPRINT CHR$(27); "I";CHR$(6); "AAA"
```

4.1

«Printing»

000

# ESC 7    ESC 6

## Select Character Set

	ESC 7	ESC 6
Hex. code	1B 37	1B 36
Dec. code	27 55	27 54

The ESC 7 code selects character set 1, and the ESC 6 code selects character set 2. There are two types of character set 2: character set 2 and character set 2'. (See chapter 6)

4.1

**DIP-SW**

**DIP-SW No. 2-3, 2-4**

**Format**

**ESC 7**

**LPRINT CHR\$ (27); "7";**

**ESC 6**

**LPRINT CHR\$ (27); "6";**

### ESC \ (n1 n2)

Hex. code                      1B   5C   (n1 n2)

Dec. code                      27   92   (n1 n2)

This code allows a specified number of characters allotted to the control codes to be printed. The characters that may be printed are specified by control codes 0~31 and 128~159 of character set 1, and control codes 0~31 of character sets 2 and 2' (Refer to Chapter 6, "All Characters"). The number of characters to be printed is specified by (n1 n2):

n2=number of characters ÷ 256  
n1=remainder

To print 530 characters:

530/256=2 (remainder=18)  
n1=18  
n2=2

#### Format

ESC \

LPRINT CHR\$(27); "\", (n1 n2);

#### Example

Line 10 uses the Select All Characters Print Mode 1 command to specify that the characters assigned to the 9 following control codes are to be printed. Line 20 sends the 9 control codes.

#### «Sample Program»

```
10 LPRINT CHR$(27); "\",CHR$(9);CHR$(0);
20 LPRINT CHR$(3);CHR$(4);CHR$(5);CHR$(6);
   CHR$(20);CHR$(21);CHR$(26);CHR$(27);CHR$(31)
```

#### «Printing»

◆◆◆◆◆◆◆◆◆◆



### ESC

Hex. code	1B	5E
Dec. code	27	94

This code allows the characters allotted to the control codes to be printed. When this code is received, only one character at a time may be printed. The characters that may be printed are specified by control codes 0~31 and 128~159 of character set 1, and control codes 0~31 of character sets 2 and 2'. Refer to Chapter 6, "All Characters".

#### Format

ESC ^ LPRINT CHR\$(27); "^";

#### Example

Line 10 uses the Select All Characters Print Mode 2 command to specify that the character assigned to the following control code is to be printed. At the end of line 10 is the control code 21 which causes the section symbol to be printed.

#### «Sample Program»

```
10 LPRINT CHR$(27); "^";CHR$(21);  
20 LPRINT "1. All Character Printing"
```

#### «Printing»

§1. All Character Printing

# ESC <

## Home Print Head

### ESC <

Hex. code

1B 3C

Dec. code

27 60

When this code is received, the print head will be returned to the mechanical leftmost position regardless of the left margin. This code must be sent at the head of a line or it will be invalid.

## 4.1.4 Character Control Codes

The character control codes, each consisting of a few bytes, give variety to characters.

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Empha-sized Print	ESC E	1B 45	27 69	Set emphasized print	4-53
	ESC F	1B 46	27 70	Clear emphasized print	4-53
Double Strike Print	ESC G	1B 47	27 71	Set double strike print	4-54
	ESC H	1B 48	27 72	Clear double strike print	4-54
Underline	ESC – SOH	1B 2D 01	27 45 1	Start underline	4-55
	ESC – NUL	1B 2D 00	27 45 0	Stop underline	4-55
Super/ Subscript Character	ESC S NUL	1B 53 00	27 83 0	Superscript character command	4-56
	ESC S SOH	1B 53 01	27 83 1	Subscript character command	4-56
	ESC T	1B 54	27 84	Clear super/subscript characters	4-56
Double Width Print	ESC W SOH	1B 57 01	27 87 1	Select double width characters	4-57
	ESC W NUL	1B 57 00	27 87 0	Clear double width characters	4-57
Overscore	ESC __SOH	1B 5F 01	27 95 1	Start overscore	4-58
	ESC __NUL	1B 5F 00	27 95 0	Stop overscore	4-58
Proportioal Spacing	ESC P SOH	1B 50 01	27 80 1	Set proportional spacing	4-59
	ESC P NUL	1B 50 00	27 80 0	Clear proportional spacing	4-59
Dot Spacing	ESC (SP)	1B 20	27 32	Set dot spacing	4-60

# ESC E ESC F

## Set/Clear Emphasized Print

	ESC E	ESC F
Hex. code	1B 45	1B 46
Dec. code	27 69	27 70

The ESC E code sets emphasized print. The ESC F code clears emphasized print.

### Format

ESC E

LPRINT CHR\$(27); "E";

ESC F

LPRINT CHR\$(27); "F";

4.1

### Example

After printing "ABCDEF", set emphasized print and print "GHIJKL." Then clear emphasized print and print "MNOPQR."

### «Sample Program»

```
10 LPRINT "ABCDEF";CHR$(27);"E GHIJKL";  
20 LPRINT CHR$(27);"F MNOPQR"
```

### «Printing»

ABCDEF **GHIJKL** MNOPQR

# ESC G ESC H

## Set/Clear Double Strike Print

	ESC G	ESC H
Hex. code	1B 47	1B 48
Dec. code	27 71	27 72

Double strike print performs printing in two passes of the print head. The ESC G code sets double strike print. The ESC H code clears double strike print.

4.1

### Format

ESC G                    LPRINT CHR\$(27); "G";

ESC H                    LPRINT CHR\$(27); "H";

### Example

After printing "ABCDEF", set double strike print and print "GHIJKL." Then clear double strike print and print "MNOPQR."

### «Sample Program»

```
10 LPRINT "ABCDEF";CHR$(27);"GGHIJKL";  
20 LPRINT CHR$(27);"HMNOPQR"
```

### «Printing»

ABCDEF GHI JKLMNOPQR

# ESC – SOH ESC – NUL

## Start/Stop Underline Mode

	ESC – SOH			ESC – NUL		
Hex. code	1B	2D	01	1B	2D	00
Dec. code	27	45	1	27	45	0

The ESC – SOH code sets underlining. The ESC – NUL code clears underlining. These codes do not apply to the space set by horizontal tab and Graphic CG characters.

4.1

### Format

ESC – SOH

LPRINT CHR\$ (27); “ – ”; CHR\$ (1);

ESC – NUL

LPRINT CHR\$ (27); “ – ”; CHR\$ (0);

### Example

After printing “ABCDEF”, send the underline set code and print “GHIJKL.” Then send the underline clear code and print “MNOPQR.”

### «Sample Program»

```
10 LPRINT "ABCDEF";CHR$(27);"–";CHR$(1);  
20 LPRINT "GHIJKL";CHR$(27);"–";CHR$(0);  
30 LPRINT "MNOPQR"
```

### «Printing»

ABCDEFGHIJKLMNOPQR

**ESC S NUL**  
**ESC S SOH**

**ESC T**

**Set/Clear Super/Subscript Characters**

	ESC S NUL	ESC S SOH	ESC T
Hex. code	1B 53 00	1B 53 01	1B 54
Dec. code	27 83 0	27 83 1	27 84

4.1

These codes set or clear superscript or subscript character mode. The ESC S NUL code sets superscript character mode. The ESC S SOH sets subscript character mode. The ESC T code clears both superscript and subscript. The DP font is used for Super/Subscript in NLQ print mode. Superscript and subscript characters can't be printed simultaneously. The mode that is chosen last is the one that will become active.

**Format**

ESC S NUL	LPRINT CHR\$ (27); "S"; CHR\$ (0);
ESC S SOH	LPRINT CHR\$ (27); "S"; CHR\$ (1);
ESC T	LPRINT CHR\$ (27); "T";

**Example**

Print A to H in normal, superscript and subscript characters in this order. To clarify the difference between such characters, underline the printed characters. (See page 4-55.)

**«Sample Program»**

```
10 LPRINT CHR$(27); "-" ;CHR$(1) ;
20 LPRINT "ABCDEFGH"
30 LPRINT CHR$(27); "S" ;CHR$(0) ; "ABCDEFGH"
40 LPRINT CHR$(27); "S" ;CHR$(1) ; "ABCDEFGH"
50 LPRINT CHR$(27); "T" ; "ABCDEFGH"
```

**«Printing»**

```
ABCDEF GH
ABCDEF GH
ABCDEF GH
ABCDEF GH
```

ESC W SOH  
ESC W NUL

Select/Clear Double Width  
Characters

	ESC W SOH			ESC W NUL		
Hex. code	1B	57	01	1B	57	00
Dec. code	27	87	1	27	87	0

The ESC W SOH code sets double width character mode. The ESC W NUL code clears double width character mode. The ESC W NUL code also clears the double width character mode which is set by the SO code.

4.1

Format

ESC W SOH                   LPRINT CHR\$ (27); "W"; CHR\$ (1);

ESC W NUL                   LPRINT CHR\$ (27); "W"; CHR\$ (0);

Example

Print "ABCDEFGH", send the ESC W SOH code, and print "1234567890". Then, send the CR code and print "ABCDEFGH" Next, send the ESC W NUL code and print "1234567890".

«Sample Program»

```
10 LPRINT "ABCDEFGH" ;  
20 LPRINT  CHR$ (27) ; "W" ; CHR$ (1) ; "1234567890"  
30 LPRINT  "ABCDEFGH" ; CHR$ (27) ; "W" ; CHR$ (0) ;  
   "1234567890"
```

«Printing»

```
ABCDEFGH1234567890  
ABCDEFGH1234567890
```



# ESC \_\_SOH ESC \_\_NUL

Start/Stop Overscore

	ESC __SOH				ESC __NUL		
Hex. code	1B	5F	01		1B	5F	00
Dec. code	27	95	1		27	95	0

The ESC\_\_SOH code sets overscore. The ESC\_\_NUL code clears overscore. These codes do not apply to the space set by horizontal tab and Graphic CG characters.

## Format

ESC\_\_SOH                      LPRINT CHR\$(27); "\_\_"; CHR\$(1);

ESC\_\_NUL                      LPRINT CHR\$(27); "\_\_"; CHR\$(0);

## Example

After printing "abc", send the overscore set code and print "def." Then send the overscore clear code and print "ghi."

## «Sample Program»

```
10 LPRINT "abc";CHR$(27);"_" ;CHR$(1);
20 LPRINT "def";CHR$(27);"_" ;CHR$(0);
30 LPRINT "ghi"
```

## «Printing»

abc~~de~~fghi

ESC P SOH  
ESC P NUL

Set/Clear Proportional Spacing

	ESC P SOH			ESC P NUL		
Hex. code	1B	50	01	1B	50	00
Dec. code	27	80	1	27	80	0

When this code sequence is received, subsequent characters are printed in proportional spacing mode. The ESC P SOH code sets proportional spacing. The ESC P NUL code clears proportional spacing.

Format

ESC P SOH                   LPRINT CHR\$(27); "P"; CHR\$(1);

ESC P NUL                   LPRINT CHR\$(27); "P"; CHR\$(0);

Example

Print "abcdefghijklmnopqrstuvwxyz" in pica; then in proportional spacing. The same operations are repeated in Elite and Condensed.

«Sample Program»

```
10 LPRINT "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27); "P"; CHR$(1)  
20 LPRINT "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27); "P"; CHR$(0)  
30 LPRINT CHR$(27); ":"; "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27); "P"; CHR$(1)  
40 LPRINT "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27); "P"; CHR$(0)  
50 LPRINT CHR$(27); CHR$(15); "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27); "P"; CHR$(1)  
60 LPRINT "abcdefghijklmnopqrstuvwxyz"
```

«Printing»

abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz

## ESC (SP)

## Set Dot Spacing

**ESC (SP) (n)**

**Hex. code**

**1B      20      (n)**

**Dec. code**

**27      32      (n)**

**Insert n dot space between each character. Dot space varies according to the currently selected pitch. (n) must be from 0 to 255.**

### Format

**ESC (SP)**

**LPRINT CHR\$ (27); “(SP)”;** (n);

### Example

**Print "ABC".**

Expand dot spacing between A, B and C in 16-dot increments by sending ESC (SP) (n).

### «Sample Program»

```
10 FOR N=0 TO 255 STEP 16
20 LPRINT CHR$(27);" ";CHR$(N);"ABC"
30 NEXT N
```

**«Printing»**

---

## 4.1.5 System Control Codes

---

The system control codes, each consisting of a few bytes, select each system functions.

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
PE De- tection	ESC 8	1B 38	27 56	PE ineffective	4-62
	ESC 9	1B 39	27 57	PE effective	4-62
Deselect	ESC Q ETX	1B 51 03	27 81 3	Deselect Printer	4-63

# ESC 8 ESC 9

## Set/Clear PE (Paper Empty) Detection

	ESC 8	ESC 9
Hex. code	1B 38	1B 39
Dec. code	27 56	27 57

ESC 8 makes the PE detection ineffective. ESC 9 makes the PE detection effective.

4.1

### Format

ESC 8                   LPRINT CHR\$ (27); "8";

ESC 9                   LPRINT CHR\$ (27); "9";

# ESC Q ETX

## Deselect Printer

	ESC	Q	ETX
Hex. code	1B	51	03
Dec. code	27	81	3

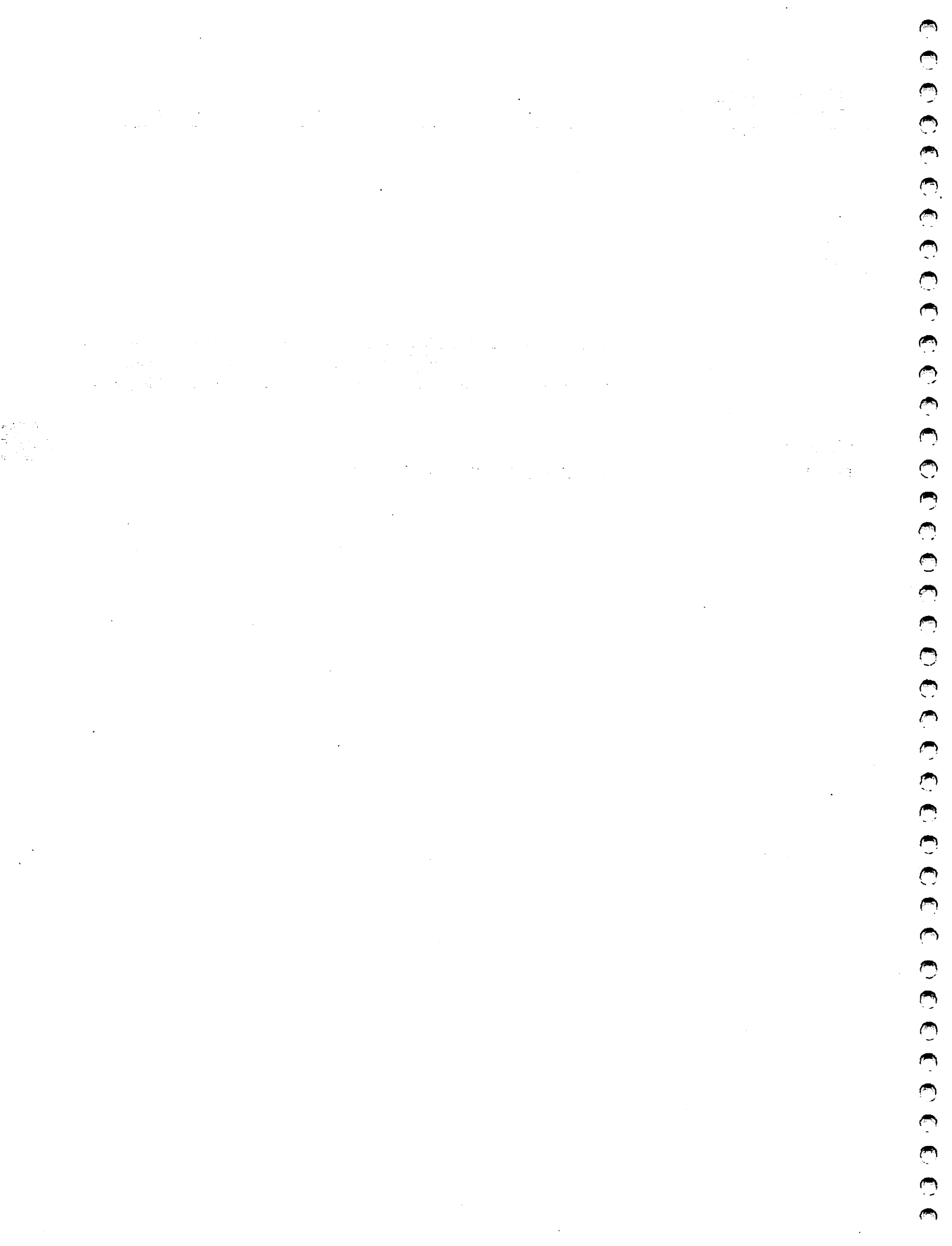
This code deselects the printer. To select the printer, send DC1 code (refer to page 4-14) or press the **ON LINE** switch twice on the operation panel (refer to page 2-11). While the printer is deselected, all data except for DC1 is ignored.

### Format

ESC Q 3

LPRINT CHR\$ (27); "Q"; CHR\$ (3);

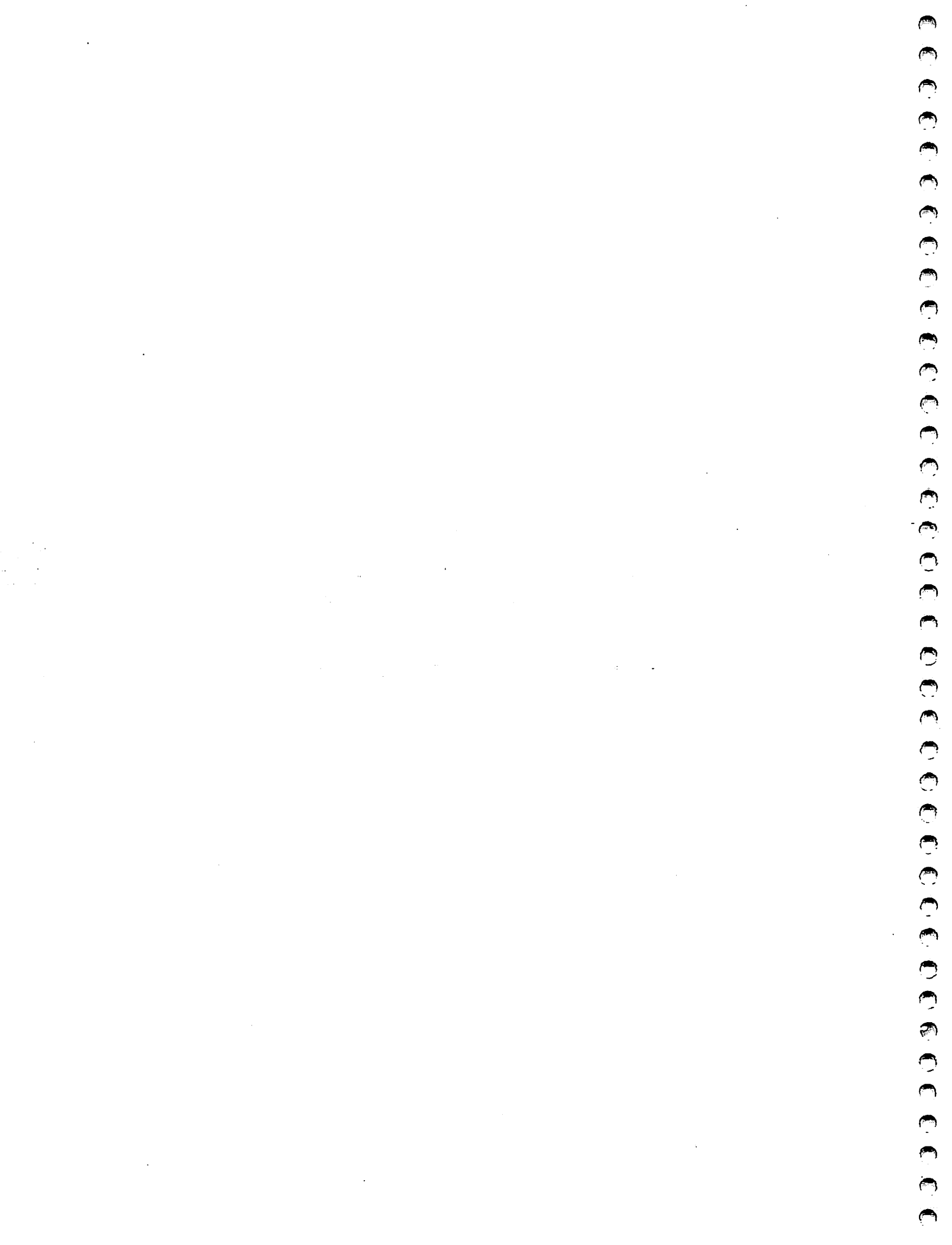
4.1



# **CHAPTER 4.2**

## **EPSON MODE**





---

## 4.2.1 Understanding The Code Explanations

---

### UNDERSTANDING THE CODE EXPLANATIONS

Although the following explanations are designed to be simple and to convey as much useful information as possible, some concepts such as how to use parameters may not be clear to users who are new to computers and printers. Therefore this short explanation is included to prepare you for the chapters that follow.

#### Page Design

Most of the command explanations take up one complete page. In cases where commands are similar or related, there may be two or even three explanations per page. In still other cases, one complex command may take up two or more pages. But to keep everything as understandable as possible, most of the command explanations are broken down in the following way.

#### Top of Page

At the very top, left corner of the page is the command. To the right is a short description. A little below are the command and if necessary, its parameters. Here, the corresponding hexadecimal and decimal values are given. Still below, is a short but detailed explanation of the command and its parameters.

#### Middle of Page

If necessary, the **DIP-SW** label which includes the numbers of the DIP switches that may affect the command is listed.

The **Format** label which includes how the command is sent to your printer is listed. The BASIC language and decimal values are used here. But BE CAREFUL! To save space, the parameters aren't printed in the format that you will use when they are to be sent to your printer. The proper format is fully explained in "USING PARAMETERS" which soon follows.

#### Bottom of Page

The **Example** label is listed. This includes a short explanation of a following BASIC program. A little below this is the BASIC program which can be used to show you how to operate your printer. If you want to use it, type it in exactly as shown. A little below the BASIC program is a printout of what you should see when the program is run. To insure correct results when this program is run, make sure that the DIP SW settings of your printer are set according to factory specifications. If your printer doesn't perform as expected, make sure that you have typed the program correctly.

## USING PARAMETERS

When controlling your printer, there may be some variable information that your printer needs in order to perform correctly. For example; how does your printer know how much of the following data will be printed as graphics instead of alphanumeric characters? It doesn't. Therefore you must tell your printer. And you do this by following certain commands with parameters. By using parameters, you can tell your printer how many 1/72" increments to feed the paper or you can tell your printer that the following number of data should be used for graphics. In any case, the parameters used in this manual have been broken down into the following types:

### FORMAT IN EXPLANATIONS

#### TYPE A

Single parameters. Usually used when passing one type of information. Used only once per command.

(n)

#### TYPE B

Same as TYPE A but used when TYPE C parameters are to be included within the same command.

(m)

#### TYPE C

Multiple parameters. Used to specify the amount of data that will be used with the command.

(n1 n2) or  
(n1 n2 n3) or  
(n1 n2 n3 n4)

Also used to specify a continuing stream of information with nn representing the last unit of information.

(n1 n2 ... nn) or  
(n1 n2 n3 ... nn)

#### TYPE D

Data series parameters. Each element of the parameter represents one unit or one byte of a continuing stream of data. With dn representing the last unit of data.

(d1 d2 d3 ... dn)

## TYPE E

Parameters that can't be classified. These are thoroughly explained when used.

(q) or (c) or (c1)

Notice that the same types of parameters are always enclosed as a group within one set of parenthesis instead of being separately enclosed.

Throughout this manual you will find many cases where commands must include or be followed by parameters. Depending on the needs of the commands, the ways that parameters must be calculated differ. Therefore parameter calculation is explained along with the corresponding commands. However, once the value for a parameter is known, it is sent by using the `CHR$( )` function of the BASIC language. Each element of every parameter must be sent with its own `CHR$( )` statement. The proper BASIC language format for each command is always shown next to the **Format** label under each command explanation, but the parameters aren't shown as they are actually sent. This is to save space because some commands require many parameter elements. Keep this fact in mind when using this manual and if you aren't sure how to send a command with its parameters, refer to the examples below that show how a command appears next to the **Format** label and how the command is actually sent.

4.2

---

ESC J                      — n/216" Line Feed Command —                      n = 48

**Format**                      LPRINT CHR\$(27); "J"; (n);

HOW IT IS SENT:

LPRINT CHR\$(27); "J"; CHR(48);

---

ESC K                      — Bit Image Graphics Command —                      n1 = 244, n2 = 1, d1 = 10,  
d2 = 20, d3 = 255, dn = 170

**Format**                      LPRINT CHR\$(27); "K"; (n1 n2) (d1 d2 d3 ... dn);

HOW IT IS SENT:

LPRINT CHR\$(27); "K"; CHR\$(244); CHR\$(1); CHR\$(10); CHR\$(20); CHR\$(255); CHR\$(170);

---

---

## 4.2.2 Function Codes

---

This printer performs printing according to the printing data from the host computer. However, print data only, does not allow the printer to fully perform all its functions. Besides print data, the function codes are used to select various printer functions.

Code Name	Hex. Code	Dec. Code	Function	Ref. Page
BS	08	8	Backspace	4-71
HT	09	9	Horizontal Tabulation	4-72
LF	0A	10	Line Feed	4-73
VT	0B	11	Vertical Tabulation	4-74
FF	0C	12	Form Feed	4-76
CR	0D	13	Carriage Return	4-77
SO	0E	14	Select Double Width Characters	4-78
SI	0F	15	Select Condensed Characters	4-79
DC1	11	17	Select Printer	4-80
DC2	12	18	Clear Condensed Characters	4-79
DC3	13	19	Deselect Printer	4-80
DC4	14	20	Clear Double Width Characters	4-78
CAN	18	24	Cancel	4-81
ESC	1B	27	Escape	4-82
DEL	7F	127	Delete Character	4-83

The print samples are printed out on condition that all functions and menus are factory default selected.

### BS

Hex. code

08

Dec. code

8

This code moves the carriage one character space to the left in the current character pitch.

When the printer receives this code continuously, backspacing will be performed continuously the number of times that this code has been received.

#### Format

BS

LPRINT CHR\$(8);

#### Example

Print “^” over “a” using the BS code.

1. Print “a”.
2. Send BS code and print “^”.

#### «Sample Program»

```
10 LPRINT "a";CHR$(8);"^"
```

#### «Printing»

a^

	<b>HT</b>
<b>Hex. code</b>	<b>09</b>
<b>Dec. code</b>	<b>9</b>

This code moves the carriage position to the horizontal tab position set at power on or to predetermined horizontal tab positions that have been set by sending the Horizontal Tab Set code (refer to page 4-104). When no tab is set to the right (from the current dot position), or if all tabs are cleared, this code is ignored.

### Format

**HT** **LPRINT CHR\$ (9);**

4.2

### Example

1. Print "AAA".
  2. Send one HT code and print "BBB".
  3. Send one HT code and print "CCC".
  4. Send two HT codes and print "DDD".
- (When the printer is powered up, tabs are automatically set every 8 columns.)

### «Sample Program»

```
10 LPRINT "12345678901234567890
      12345678901234567890"
20 LPRINT "AAA";CHR$(9);"BBB";CHR$(9);
      "CCC";CHR$(9);CHR$(9);"DDD"
```

### «Printing»

```
1234567890123456789012345678901234567890
AAA      BBB      CCC      DDD
```

### LF

Hex. code

0A

Dec. code

10

This code executes a single line feed.

### Format

LF

**LPRINT CHR\$ (10);**

### Example

Print "AAA", "BBB", "CCC", and "DDD" with line feeding.

4.2

### «Sample Program»

```
10 LPRINT "AAA";CHR$(10);"BBB";CHR$(10);  
    "CCC";CHR$(10);"DDD"
```

### «Printing»

```
AAA  
BBB  
CCC  
DDD
```



### VT

**Hex. code**

**0B**

**Dec. code**

**11**

This code moves the carriage to predetermined vertical tab positions which have been set by the ESC B or ESC b. At power on, no vertical tabs are set (refer to page 4-99, 4-100).

When no vertical tabs are set, the paper is fed a single line.

### Format

**VT**

**LPRINT CHR\$ (11);**

4.2

### Example

Use ESC B to set vertical tabs at the 6th, 12th, 18th, 24th, and 30th lines. Then print "AAA", "BBB", "CCC", and "DDD" by sending the VT code.

1. Print "AAA".
2. Send one VT code and print "BBB".
3. Send one VT code and print "CCC".
4. Send two VT codes and print "DDD".

**«Sample Program»**

```
10 LPRINT CHR$(27);"B";CHR$(6);CHR$(12);  
   CHR$(18);CHR$(24);CHR$(30);CHR$(0);  
20 LPRINT "AAA";CHR$(11);"BBB";CHR$(11);  
   "CCC";CHR$(11);CHR$(11);"DDD"
```

**«Printing»**

AAA

BBB

CCC

DDD

	<b>FF</b>
<b>Hex. code</b>	<b>0C</b>
<b>Dec. code</b>	<b>12</b>

This code feeds paper for one page.  
When the FF code is received, it feeds the paper to next top of form position (the first line of the page).

### DIP-SW

**DIP-SW No. 1-5**

### Format

**FF**

**LPRINT CHR\$ (12);**

### Example

Set the "TOF" to 3". Print "TOF" then send the FF code to print "TOF".

### «Sample Program»

```
10 LPRINT CHR$(27); "C"; CHR$(0); CHR$(3);
20 LPRINT "_____ TOF _____"; CHR$(12)
30 LPRINT "_____ TOF _____"
```

### «Printing»

\_\_\_\_\_ TOF \_\_\_\_\_

\_\_\_\_\_ TOF \_\_\_\_\_

**CR**

Hex. code

0D

Dec. code

13

This code moves the next printing position to the left margin position.

**DIP-SW****DIP-SW No. 1-3****Format****CR****LPRINT CHR\$(13);**

4.2

**Example**

Print "AAAAAAAAAA" by sending the CR code.  
Print "BBBBBBBBBB" and "CCCCCCCCCC" by sending the CR code.  
Print "DDDDDDDDDD" by sending the CR code.

**«Sample Program»**

```
10 LPRINT "AAAAAAAAAA";CHR$(13);CHR$(10);  
20 LPRINT "BBBBBBBBBB";  
30 LPRINT "CCCCCCCCCC";CHR$(13);CHR$(10);  
40 LPRINT "DDDDDDDDDD"
```

**«Printing»**

```
AAAAAAAAAA  
BBBBBBBBBBCCCCCCCCCC  
DDDDDDDDDD
```

# SO DC4

## Select/Clear Double Width Characters

	SO	DC4
Hex. code	0E	14
Dec. code	14	20

These codes set or clear the double width character mode. The SO code sets the double width character mode which elongates the subsequent characters. The DC4 code clears the double width character mode. The SO code is also cleared by CAN, LF, FF, VT, ESC W0, ESC !.

### Format

SO

LPRINT CHR\$(14);

DC4

LPRINT CHR\$(20);

### Example

After printing "ABC", send the SO code, print "DEF", send the DC4 code, and print "GHI".

### «Sample Program»

```
10 LPRINT "ABC";CHR$(14);"DEF";CHR$(20);"GHI"
```

### «Printing»

ABCDEF GHI

# SI DC2

## Select/Clear Condensed Characters

	SI	DC2
Hex. code	0F	12
Dec. code	15	18

The SI code sets the condensed character mode which condenses the subsequent characters. The DC2 code clears the condensed character mode.  
The SI code can also be sent as ESC SI (27 15).

### DIP-SW

DIP-SW No. 1-1

### Format

SI LPRINT CHR\$ (15);

DC2 LPRINT CHR\$ (18);

4.2

### Example

After printing "ABC", send the SI code, print "DEF", send DC2 code, and print "GHI".

### «Sample Program»

```
10 LPRINT "ABC";CHR$(15);"DEF";CHR$(18);"GHI"
```

### «Printing»

ABCDEFGHI

# DC1 DC3

## Select/Deselect Printer

	DC1	DC3
Hex. code	11	13
Dec. code	17	19

DC1 is used to place the printer in the Select condition.  
DC3 is used to place the printer in the Deselect condition. The printer does not accept receive data until DC1 code is received or the **ON LINE** switch is depressed twice.

### Format

**DC1**                      **LPRINT CHR\$ (17);**

**DC3**                      **LPRINT CHR\$ (19);**

## CAN

Hex. code	18
Dec. code	24

All print data following the last print command and preceding the CAN code are canceled. The SO code is also canceled but other function codes aren't affected.

### Format

CAN                      LPRINT CHR\$ (24);

4.2

### Example

Send "ABC", send the CAN code, then send "DEF".

«Sample Program»                      10 LPRINT "ABC" ;CHR\$ (24) ; "DEF"

«Printing»                              DEF



# ESC

Escape

## ESC

Hex. code                      1B

Dec. code                      27

This code is for starting expanded function codes. This code is used in combination with other codes.

### Format

ESC                      LPRINT CHR\$ (27);

# DEL

## Delete Character

### DEL

Hex. code

7F

Dec. code

127

This code deletes the last character stored in the data buffer. This code is ignored if the character pitch is changed or the proportional pitch is selected.

#### Format

DEL

LPRINT CHR\$(127);

#### Example

After sending "ABCC", send the DEL code to delete the last "C", then send "DEF".

«Sample Program»

```
10 LPRINT "ABCC";CHR$(127);"DEF"
```

«Printing»

ABCDEF

## 4.2.3 Expanded Function Codes

The expanded function codes are multi-byte control codes.

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Print Direction	ESC U NUL	1B 55 00	27 85 0	Bidirectional	4-86
	ESC U SOH	1B 55 01	27 85 1	Unidirectional	4-86
Print Quality	ESC x NUL	1B 78 00	27 120 0	DP	4-87
	ESC x SOH	1B 78 01	27 120 1	NLQ (*1)	4-87
Character Pitch	ESC P	1B 50	27 80	10 CPI (Pica)	4-88
	ESC M	1B 4D	27 77	12 CPI (Elite)	4-88
Self-cancelling LF Pitch	ESC J	1B 4A	27 74	n/216" line feed	4-89
	ESC j	1B 6A	27 106	n/216" reverse line feed	4-90
Line Feed	ESC 2	1B 32	27 50	1/6" line feed	4-91
	ESC 0	1B 30	27 48	1/8" line feed	4-91
	ESC 1	1B 31	27 49	7/72" line feed	4-91
	ESC A	1B 41	27 65	(n)/72" line feed	4-92
	ESC 3	1B 33	27 51	(n)/216" line feed	4-93
Page Length	ESC C	1B 43	27 67	Set page length (line)	4-94
	ESC C NUL	1B 43 00	27 67 0	Set page length (inch)	4-95
Skip Perforation	ESC N	1B 4E	27 78	Skip (n) lines	4-97
	ESC O	1B 4F	27 79	Clear skip perforation	4-97
Vertical Tab	ESC B	1B 42	27 66	Set vertical tab	4-99
	ESC b	1B 62	27 98	Set vertical tab (channel)	4-100
	ESC /	1B 2F	27 47	Select channel	4-100
Left or Right Margin	ESC I	1B 6C	27 108	Set left margin	4-102
	ESC Q	1B 51	27 81	Set right margin	4-102
Horizontal Tab	ESC D	1B 44	27 68	Set horizontal tab	4-104

\*1: The action of these codes depends on the DIP-Switch setting.  
(Refer to "3.1.2 DIP Switch Setting", page 3-3.)

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Bit Image Graphic Mode	ESC K	1B 4B	27 75	60 DPI	4-105
	ESC L	1B 4C	27 76	120 DPI	4-107
	ESC Y	1B 59	27 89	120 (half) DPI	4-107
	ESC Z	1B 5A	27 90	240 DPI	4-107
	ESC *	1B 2A	27 42	60~240 DPI	4-108
	ESC ?	1B 3F	27 63	Change bit image graphic mode	4-110
	ESC ^	1B 5E	27 94	9-pin bit image graphics	4-111
Down-load	ESC :	1B 3A	27 58	Copy ROM characters	4-113
	ESC &	1B 26	27 38	Define download characters	4-114
	ESC %	1B 25	27 37	CG definition	4-121
International Character	ESC R	1B 52	27 82	Select international characters	4-123
MSB Control	ESC #	1B 23	27 35	Clear MSB control	4-126
	ESC =	1B 3D	27 61	Set MSB=0	4-126
	ESC >	1B 3E	27 62	Set MSB=1	4-126
Print Table Control	ESC 6	1B 36	27 54	Upper code area control	4-128
	ESC 7	1B 37	27 55	Code area control	4-128
Code Area Control	ESC I SOH .	1B 49 01	27 73 1	Print table	4-129
	ESC I NUL	1B 49 00	27 73 1	Code area table	4-129
Home Head	ESC <	1B 3C	27 60	Home head	4-130

**ESC U NUL**  
**ESC U SOH**

Select Print Direction

	ESC U NUL			ESC U SOH		
Hex. code	1B	55	00	1B	55	01
Dec. code	27	85	0	27	85	1

The ESC U NUL code selects bidirectional print, and the ESC U SOH code selects unidirectional print.

**Format**

ESC U NUL                    **LPRINT CHR\$ (27); "U"; CHR\$ (0);**

ESC U SOH                    **LPRINT CHR\$ (27); "U"; CHR\$ (1);**

**ESC x NUL**  
**ESC x SOH**

**Select Print Quality**

	ESC x NUL			ESC x SOH		
Hex. code	1B	78	00	1B	78	01
Dec. code	27	120	0	27	120	1

These codes select print quality. The ESC x NUL code selects DP (Data Processing) mode, and the ESC x SOH code selects NLQ (Near Letter Quality).

**DIP-SW**

**DIP-SW No. 1-8**

**Format**

**ESC x NUL**

**LPRINT CHR\$(27); "x"; CHR\$(0);**

**ESC x SOH**

**LPRINT CHR\$(27); "x"; CHR\$(1);**

4.2

**Example**

Print the alphabet in NLQ1 mode with DIP SW 1-8 open.  
Print the alphabet in NLQ2 mode with DIP SW 1-8 closed.

**«Sample Program»**

```
10 LPRINT CHR$(27); "x"; CHR$(0);  
   "ABCDEFGH IJKLMNOPQRSTUVWXYZ"  
20 LPRINT CHR$(27); "x"; CHR$(1);  
   "ABCDEFGH IJKLMNOPQRSTUVWXYZ"
```

**«Printing»**

with DIP SW 1-8 open  
ABCDEFGH IJKLMNOPQRSTUVWXYZ  
ABCDEFGH IJKLMNOPQRSTUVWXYZ  
with DIP SW 1-8 closed  
ABCDEFGH IJKLMNOPQRSTUVWXYZ  
ABCDEFGH IJKLMNOPQRSTUVWXYZ

# ESC P ESC M

## Select Character Pitch

	ESC P	ESC M
Hex. code	1B 50	1B 4D
Dec. code	27 80	27 77

These codes select character pitch. The ESC P code selects 10 CPI (Pica pitch), and the ESC M code selects 12 CPI (Elite pitch).

### DIP-SW

DIP-SW No. 1-1

### Format

ESC P

LPRINT CHR\$(27); "P";

ESC M

LPRINT CHR\$(27); "M";

### Example

Print A to N by using ESC P and ESC M, respectively.

### «Sample Program»

```
10 LPRINT CHR$(27); "P";  
20 FOR N=65 TO 78:LPRINT CHR$(N); :NEXT  
30 LPRINT  
40 LPRINT CHR$(27); "M";  
50 FOR N=65 TO 78:LPRINT CHR$(N); :NEXT  
60 LPRINT
```

### «Printing»

ABCDEFGHIJKLMN  
ABCDEFGHIJKLMN

ESC J (n)

Hex. code	1B 4A (n)
Dec. code	27 74 (n)

This line feed command code causes an  $n/216$ " line feed according to the value of (n). (n) should be in the range of 0 to 255.  
The data preceding this code is printed out. On completing this line feed, this code is canceled. (Each reception of this code corresponds to each movement.)

Format

ESC J LPRINT CHR\$(27); "J"; (n);

4.2

Example

Print "H" with (n) set to 16, 32 and 64, respectively.

«Sample Program»

```
10 LPRINT "HHHHHHHHHH"CHR$(27); "J" ;CHR$(16) ;
20 LPRINT "HHHHHHHHHH"CHR$(27); "J" ;CHR$(32) ;
30 LPRINT "HHHHHHHHHH"CHR$(27); "J" ;CHR$(64) ;
40 LPRINT "HHHHHHHHHH"
```

«Printing»

HHHHHHHHHH HHHHHHHHHH  
HHHHHHHHHH  
HHHHHHHHHH



### ESC j (n)

Hex. code            1B    6A    (n)

Dec. code            27    106    (n)

This is the line feed command code causes a reverse n/216" line feed according to the value of (n). (n) should be in the range of 0 to 255.

The data preceding this code is printed out. On completing the line feed, this code is canceled. (Each reception of this code corresponds to each movement.)

NOTE: Be sure to confirm that the printer is set in the friction feed or the push tractor feed position before sending the ESC j (n) code.

#### Format

ESC j

LPRINT CHR\$(27); "j"; (n);

#### Example

Print "H" with (n) set to 16, 32 and 64, respectively.

#### «Sample Program»

```
10 LPRINT "HHHHHHHHHHH";CHR$(27);"j";CHR$(16);
20 LPRINT "HHHHHHHHHHH";CHR$(27);"j";CHR$(32);
30 LPRINT "HHHHHHHHHHH";CHR$(27);"j";CHR$(64);
40 LPRINT "HHHHHHHHHHH"
```

#### «Printing»

```

HHHHHHHHHHH
      HHHHHHHHHH
HHHHHHHHHHH HHHHHHHHHH
HHHHHHHHHHH
```

# ESC 2 ESC 0    ESC 1

## Select Line Feed Spacing

	ESC 2	ESC 0	ESC 1
Hex. code	1B 32	1B 30	1B 31
Dec. code	27 50	27 48	27 49

ESC 2 selects 1/6" line spacing.  
 ESC 0 selects 1/8" line spacing.  
 ESC 1 selects 7/72" line spacing.

### Format

ESC 2                    LPRINT CHR\$ (27); "2";  
 ESC 0                    LPRINT CHR\$ (27); "0";  
 ESC 1                    LPRINT CHR\$ (27); "1";

4.2

### Example

Print "ABCDEFGH" while performing line feeds with line spacings of 1/6", 1/8" and 7/72".

### «Sample Program»

```
10 LPRINT "ABCDEFGH";CHR$(27);"2"
20 LPRINT "ABCDEFGH";CHR$(27);"0"
30 LPRINT "ABCDEFGH";CHR$(27);"1"
40 LPRINT "ABCDEFGH"
```

### «Printing»

```
ABCDEFGH
ABCDEFGH
ABCDEEG
ABCDEFGH
```

### ESC A (n)

Hex. code            1B 41 (n)

Dec. code            27 65 (n)

This code sets a line spacing n/72" and (n) should be in the range of 0 to 85.

#### Format

ESC A                    LPRINT CHR\$(27); "A"; (n);

4.2

#### Example

Print "ABCDEFGH" with (n) set to 6, 12 and 24, respectively.

#### «Sample Program»

```
10 LPRINT "ABCDEFGH";CHR$(27);"A";CHR$(6)
20 LPRINT "ABCDEFGH";CHR$(27);"A";CHR$(12)
30 LPRINT "ABCDEFGH";CHR$(27);"A";CHR$(24)
40 LPRINT "ABCDEFGH"
```

#### «Printing»

```
ABCDEFGH
ABCDEFGH
ABCDEFGH
```

```
ABCDEFGH
```

	<b>ESC 3</b>	<b>(n)</b>
<b>Hex. code</b>	<b>1B</b>	<b>33 (n)</b>
<b>Dec. code</b>	<b>27</b>	<b>51 (n)</b>

This code sets a line spacing of n/216" according to the value of (n). (n) should be in the range of 0 to 255.

Format

ESC 3                    LPRINT CHR\$ (27); "3"; (n);

Example

Print "ABCDEFGG" with (n) set to 16, 32 and 64 respectively.

«Sample Program»

```
10 LPRINT "ABCDEFGG";CHR$(27);"3";CHR$(16)
20 LPRINT "ABCDEFGG";CHR$(27);"3";CHR$(32)
30 LPRINT "ABCDEFGG";CHR$(27);"3";CHR$(64)
40 LPRINT "ABCDEFGG"
```

«Printing»

ABCDEFGG
ABCDEFGG
ABCDEFGG

### ESC C (n)

Hex. code      1B   43   (n)

Dec. code      27   67   (n)

This code sets page length. The number of lines is specified by the value of (n) which must be 1 ~ 127. The overall page length depends on the line feed pitch. The position at which this command is used to set page length, becomes the TOF position. This command causes the skip perforation setting and vertical tab settings to be cleared.

#### Format

ESC C

LPRINT CHR\$(27); "C"; (n);

4.2

#### Example

Set page length to 10 lines. Print "–TOF–", feed the page by using the FF code (refer to page 4-76), and print "–TOF–" again.

#### «Sample Program»

```
10 LPRINT CHR$(27); "C"; CHR$(10);
20 LPRINT "_____ TOF _____"; CHR$(13); CHR$(12);
30 LPRINT "_____ TOF _____"
```

#### «Printing»

\_\_\_\_\_ TOF \_\_\_\_\_

\_\_\_\_\_ TOF \_\_\_\_\_

# ESC C NUL

Set Page Length (Inch)

## ESC C NUL (n)

Hex. code            1B   43   00   (n)

Dec. code           27   67   0   (n)

This code sets page length. The page length in inches is specified by the value of (n) which must be 1~22.

The position at which this command is used to set page length, becomes the TOF position. This command causes the skip perforation setting and vertical tab settings to be cleared.

### Format

ESC C NUL

LPRINT CHR\$(27); "C"; CHR\$(0); (n);

4.2

**Example**

Set page length to 5 inches.

Print “-TOF-”, feed the page, and print “-TOF-” again.

**«Sample Program»**

```
10 LPRINT CHR$(27);"C";CHR$(0);CHR$(5);  
20 LPRINT "_____ TOF _____";CHR$(13);CHR$(12);  
30 LPRINT "_____ TOF _____"
```

**«Printing»**

\_\_\_\_\_ TOF \_\_\_\_\_

\_\_\_\_\_ TOF \_\_\_\_\_

ESC N  
ESC O

Set/Clear Skip Perforation Mode

	ESC N	(n)	ESC O
Hex. code	1B	4E (n)	1B 4F
Dec. code	27	78 (n)	27 79

These codes set or clear the skip perforation function. This function provides space at the bottom of the page. The number of lines to skip is specified by (n). (n) is an integral number from 1 to 127. To set (n) to 10, code (0A) H or (10) is used. (The form length should be set longer than the number of lines to be skipped.) The ESC O clears the skip perforation function.

DIP-SW

DIP-SW No. 1-4

Format

ESC N	LPRINT CHR\$ (27); "N"; (n);
ESC O	LPRINT CHR\$ (27); "O";

4.2



#### Example

Set page length to 8 lines by using ESC C (n). Set skip perforation to three lines by using ESC N (n). Continuously print "A". Then send the clear code and continuously print "A".

#### «Sample Program»

```
10 LPRINT CHR$(27) ; "C" ; CHR$(8) ;  
20 LPRINT CHR$(27) ; "N" ; CHR$(3) ;  
30 FOR I=1 TO 15  
40 LPRINT "AAAAAAAAAA"  
50 NEXT I  
60 LPRINT CHR$(27) ; "O" ;  
70 FOR N=1 TO 10  
80 LPRINT "AAAAAAAAAA"  
90 NEXT N
```

#### «Printing»

```
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA
```

```
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA
```

```
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA
```

```
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA  
AAAAAAAAAA
```

	ESC B (n1 n2 . . . nn) NUL			
Hex. code	1B	42	(n1 n2 . . . nn)	00
Dec. code	27	66	(n1 n2 . . . nn)	0

This code sets tab positions according to the subsequent n1 n2 to nn. The NUL code ends the setting of the vertical tabs. The tab setting should be performed from top to bottom. Depending on the page length and line feed pitch, a maximum of 16 vertical tabs can be set. ESC B NUL clears all the vertical tabs.

Format

ESC B LPRINT CHR\$ (27); "B"; (n1 n2 . . . nn); CHR\$ (0);

Example

Set a tab stop on the 5th, 10th and 15th lines and print "A" at the tab stops by using the VT code (refer to page 4-74).

«Sample Program»

```
10 LPRINT CHR$(27);"B";CHR$(5);CHR$(10);
   CHR$(15);CHR$(0);
20 FOR N=0 TO 19
30 LPRINT N
40 NEXT N
50 FOR M=0 TO 19
60 LPRINT CHR$(27);"j";CHR$(36);
70 NEXT M
80 LPRINT "    AAA";CHR$(11);"    BBB";CHR$(11);
   "    CCC";CHR$(11);"    DDD"
```

«Printing»

```
0 AAA
1
2
3
4
5 BBB
6
7
8
9
10 CCC
11
12
13
14
15 DDD
16
17
18
19
```

ESC b  
ESC /

Set Vertical Tab Channel

	ESC b (m) (n1 n2 . . . nn) NUL	ESC / (m)
Hex. code	1B 62 (m) (n1 n2 . . . nn) 00	1B 2F (m)
Dec. code	27 98 (m) (n1 n2 . . . nn) 0	27 47 (m)

After receiving the ESC b code, the current tabs are all cleared and new tabs are ready to be set. Parameters to set line positions should be in ascending order. These tabs are set on the basis of the currently selected LF pitch. Once set, tab positions do not change even if another LF pitch is selected. When vertical tabs are set incorrectly, they will all be cleared and reset.  
m specifies the channel. Up to 16 vertical tabs can be set according to the channels 0 to 7.  
Never fail to put NUL (00) H at the end of the parameters.  
Example:

Vertical tabs in channel 0 are set at the 5th, 10th and 15th lines:

ESC b NUL (05 10 15) NUL  
1B 62 00 050A0F 00

The ESC / code is used to select the vertical tab channel according to the vertical tabs set in VFU channel m.  
NOTE:  
Vertical tabs aren't set when the power is turned ON or the printer is reset.

Format

ESC b LPRINT CHR\$ (27); "b"; (m) (n1 n2 . . . nn); CHR\$ (0);

ESC / LPRINT CHR\$ (27); "/"; (m);

### Example

Set vertical tabs in channel 1; 3rd, 6th, 17th lines.  
Set vertical tabs in channel 2; 5th, 10th, 15th lines.  
Set vertical tabs in channel 3; 3rd, 10th, 18th lines.  
Print "AAA" on channel 1.  
Print "BBB" on channel 2.  
Print "CCC" on channel 3.

### «Sample Program»

```
100 LPRINT CHR$(27);"C";CHR$(20);
110 FOR N=0 TO 19:LPRINT N:NEXT N
120 FOR N=0 TO 19:LPRINT CHR$(27);"j";CHR$(36);
    :NEXT N
130 LPRINT CHR$(27);"b";CHR$(1);CHR$(3);CHR$(6);
    CHR$(17);CHR$(0);
140 LPRINT CHR$(27);"b";CHR$(2);CHR$(5);
    CHR$(10);CHR$(15);CHR$(0);
150 LPRINT CHR$(27);"b";CHR$(3);CHR$(3);
    CHR$(10);CHR$(18);CHR$(0);
160 LPRINT CHR$(27);"/";CHR$(1);
170 LPRINT CHR$(11);"    AAA";CHR$(13);CHR$(11);
    "    AAA";CHR$(13);CHR$(11);
180 LPRINT "    AAA";CHR$(13);CHR$(12);
190 FOR N=0 TO 19:LPRINT CHR$(27);"j";CHR$(36);
    :NEXT
200 LPRINT CHR$(27);"/";CHR$(2);
210 LPRINT CHR$(11);"    BBB";CHR$(13);
    CHR$(11);"    BBB";
220 LPRINT CHR$(13);CHR$(11);"    BBB";
    CHR$(13);CHR$(12);
230 FOR N=0 TO 19:LPRINT CHR$(27);"j";CHR$(36);
    :NEXT
240 LPRINT CHR$(27);"/";CHR$(3);
250 LPRINT CHR$(11);"    CCC";CHR$(13);
    CHR$(11);"    CCC";
260 LPRINT CHR$(13);CHR$(11);"    CCC";
    CHR$(13);CHR$(12);
```

4.2

### «Printing»

```
0
1
2
3  AAA  CCC
4
5      BBB
6  AAA
7
8
9
10     BBBCCC
11
12
13
14
15     BBB
16
17  AAA
18      CCC
19
```

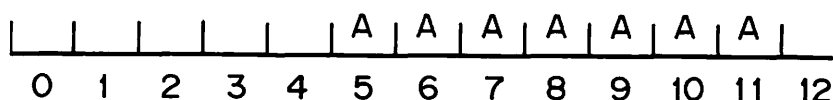
# ESC I ESC Q

## Set Left Margin/Right Margin

	ESC I (n)	ESC Q (n)
Hex. code	1B 6C (n)	1B 51 (n)
Dec. code	27 108 (n)	27 81 (n)

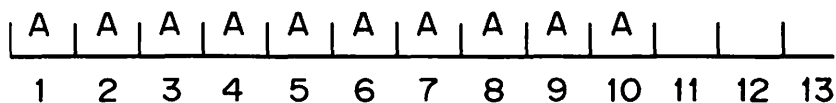
The ESC I (n) code sets the left margin at the specified position. The value of (n) specifies the column. The value of n varies according to the character pitch. The left margin is set on the basis of the current character pitch. Once set, it doesn't change even if another character pitch is selected afterwards.  
Example: Set left margin at 5th column (10 CPI).

ESC I (05)  
1B 6C 05



The ESC Q (n) code sets the right margin at the specified position. The value of (n) specifies the column. The value of n varies according to the character pitch. The right margin is set on the basis of the current character pitch. Once set, it doesn't change even if another character pitch is selected afterwards.  
Example: Set right margin at the 10th column.

ESC Q (0A)  
1B 51 0A



The range for the left and right margins is as follows.

Character Pitch	Left Margin	Right Margin
10 CPI	n=0~78 (134)	n=2~80 (136)
12 CPI	n=0~93 (160)	n=3~96 (163)
17.1 CPI	n=0~133 (229)	n=4~137 (233)
20 CPI	n=0~156 (271)	n=4~160 (272)

( ) = 15" Version

### Format

ESC I

LPRINT CHR\$ (27); "I"; (n);

ESC Q

LPRINT CHR\$ (27); "Q"; (n);

### Example

«Sample Program»

```
10 LPRINT "1234567890123456789012345678901234567890"
20 LPRINT CHR$(27); "I"; CHR$(10);
30 LPRINT "ABCDEFGH IJKLMNOPQ"
40 LPRINT CHR$(27); "I"; CHR$(0);
50 LPRINT "ABCDEFGH IJKLMNOPQ"
60 LPRINT CHR$(27); "Q"; CHR$(12);
70 LPRINT "ABCDEFGH IJKLMNOPQ"
```

4.2

«Printing»

```
1234567890123456789012345678901234567890
      ABCDEFGH IJKLMNOPQ
ABCDEFGH IJKLMNOPQ
ABCDEFGH IJKL
MNOPQ
```

### ESC D (n1 n2 . . . nn) NUL

Hex. code                    1B   44   (n1 n2 . . . nn)   00

Dec. code                    27   68   (n1 n2 . . . nn)   0

This code sets tab positions according to the subsequent n1 n2 to nn. The NUL code ends the setting of the horizontal tabs. The tab setting should be performed from left to right. Depending on the character pitch a maximum of 32 horizontal tabs can be set per line. Tabs can be set every eight columns by initializing. The ESC D NUL clears all the horizontal tabs.

#### Format

ESC D                    LPRINT CHR\$(27); "D"; (n1 n2 . . . nn); CHR\$(0);

The range for the Horizontal tabs is as follows:

CPI	Range of n
10   CPI	n=0 ~ 79 (135)
12   CPI	n=0 ~ 95 (162)
17.1 CPI	n=0 ~ 136 (232)
20   CPI	n=0 ~ 159 (270)

( ) = 15" Version

#### Example

Set a tab stop at the 5th, 10th, 15th and 20th characters and print "A" at the tab stops by using the HT code.

#### «Sample Program»

```
10 LPRINT "0123456789012345678901234567890"
20 LPRINT CHR$(27); "D"; CHR$(5); CHR$(10);
   CHR$(15); CHR$(20); CHR$(0);
30 LPRINT "A"; CHR$(9); "A"; CHR$(9); "A";
   CHR$(9); "A"; CHR$(9); "A"
```

#### «Printing»

```
0123456789012345678901234567890
A   A   A   A   A
```

	ESC K (n1 n2) (d1 d2 d3 . . . dn)			
Hex. code	1B	4B	(n1 n2)	(d1 d2 d3 . . . dn)
Dec. code	27	75	(n1 n2)	(d1 d2 d3 . . . dn)

The ESC K code selects 60 DPI bit image graphic mode which provides 8 dots per column. The number of bytes to be printed as bit image data is specified by n1n2 and the actual data bytes are represented by d1d2d3 ... dn. The data length setting method is described below.

- ① When the data length is 255 bytes or fewer, n2 is 0. Set the data length in n1.

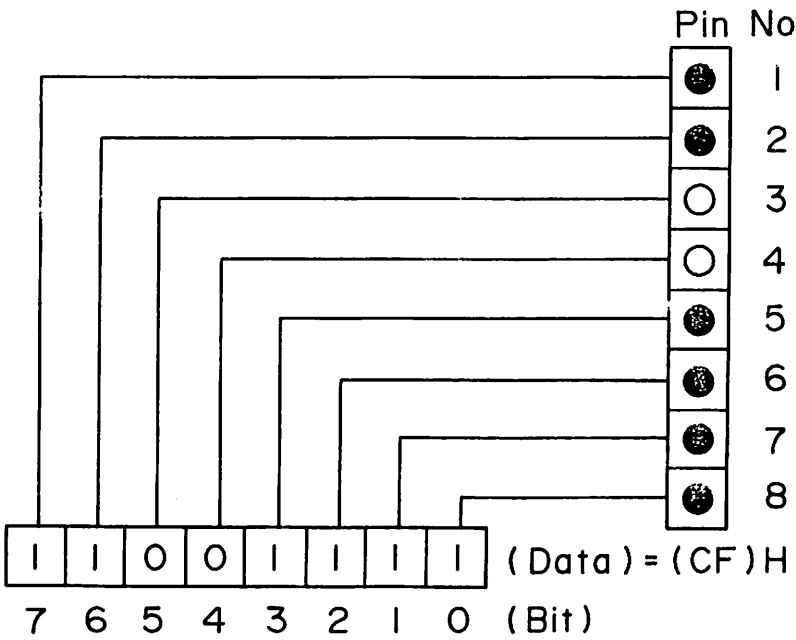
**Example** When the data length is 20 bytes:  
n1=20  
n2=0

- ② When the data length is 256 bytes or more, the result (discard the figures below the decimal point) obtained by dividing the data length by 256 bytes is put in n2, and the remainder in n1.

**Example** When the data length is 300 bytes:

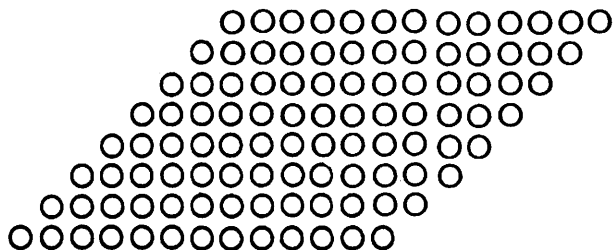
$$\begin{array}{r} 1 \dots n2 \\ 256 \overline{) 300} \\ \underline{256} \\ 44 \dots n1 \end{array}$$

The bits of each data byte correspond to the head pins as shown below:





The data setting method is as shown below.



4.2

#### Format

ESC K

LPRINT CHR\$(27); "K"; (n1 n2) (d1 d2 d3 . . . dn);

#### Example

Specify dot columns for 20 bytes. Then, print as shown below.

#### «Sample Program»

```
10 LPRINT CHR$(27); "K"; CHR$(20); CHR$(0);  
20 LPRINT CHR$(1); CHR$(3); CHR$(7); CHR$(15)  
   ; CHR$(31); CHR$(63); CHR$(127);  
30 LPRINT STRING$(6,255);  
40 LPRINT CHR$(254); CHR$(252); CHR$(248); CHR$(240)  
   ; CHR$(224); CHR$(192); CHR$(128)
```

#### «Printing»



ESC L  
ESC Y    ESC Z

Select 120/120 (Half)/240 DPI Bit  
Image Graphic Modes

	ESC L	(n1 n2) (d1 d2 d3 . . . dn)
Hex. code	1B 4C	(n1 n2) (d1 d2 d3 . . . dn)
Dec. code	27 76	(n1 n2) (d1 d2 d3 . . . dn)
	ESC Y	(n1 n2) (d1 d2 d3 . . . dn)
Hex. code	1B 59	(n1 n2) (d1 d2 d3 . . . dn)
Dec. code	27 89	(n1 n2) (d1 d2 d3 . . . dn)
	ESC Z	(n1 n2) (d1 d2 d3 . . . dn)
Hex. code	1B 5A	(n1 n2) (d1 d2 d3 . . . dn)
Dec. code	27 90	(n1 n2) (d1 d2 d3 . . . dn)

These codes are bit image graphic codes providing 8 bits per dot column. The horizontal pitches are as follows:

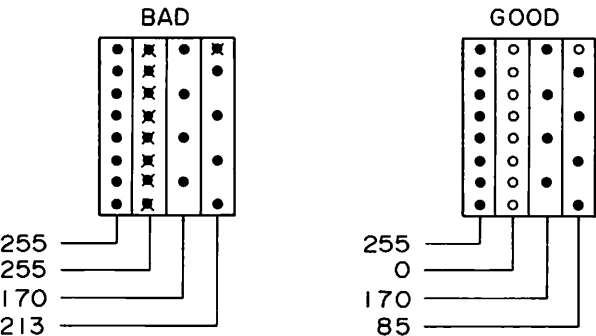
- ESC L . . . 120 DPI
- ESC Y . . . 120 DPI (Half)
- ESC Z . . . 240 DPI (Half)

The data length and data setting method are the same as the ESC K code (refer to page 4-105).

Format

ESC L	LPRINT CHR\$ (27); "L"; (n1 n2) (d1 d2 d3 . . . dn);
ESC Y	LPRINT CHR\$ (27); "Y"; (n1 n2) (d1 d2 d3 . . . dn);
ESC Z	LPRINT CHR\$ (27); "Z"; (n1 n2) (d1 d2 d3 . . . dn);

NOTE:  
ESC Y and ESC Z don't point horizontally adjacent dots. Therefore, the dots marked as '✕' can not be printed and should not be defined. This is shown in the illustration below.



	ESC *		(m)	(n1 n2)	(d1 d2 d3 . . . dn)
Hex. code	1B	2A	(m)	(n1 n2)	(d1 d2 d3 . . . dn)
Dec. code	27	42	(m)	(n1 n2)	(d1 d2 d3 . . . dn)

This code selects the bit image graphic mode. The horizontal pitch (DPI) is specified by m. The number of bytes to be printed as bit image data is specified by n1n2 and the actual data bytes are represented by d1d2d3 ... dn. The data length setting method is described below.

① When the data length is 255 bytes or fewer, n2 is 0. Set the data length in n1.

**Example** When the data length is 20 bytes:  
n1=20  
n2=0

② When the data length is 256 bytes or more, the result (discard the figures below the decimal point) obtained by dividing the data length by 256 bytes is put in n2, and the remainder in n1.

**Example** When the data length is 300 bytes:

$$\begin{array}{r} 1 \dots n2 \\ 256 \overline{) 300} \\ \underline{256} \\ 44 \dots n1 \end{array}$$

The value of m specifies to the horizontal DPI as follows.

m	BIT IMAGE DENSITY	
0	60	DPI
1	120	DPI
2	120	DPI (HALF)
3	240	DPI (HALF)
4	80	DPI
5	72	DPI
6	90	DPI
7	144	DPI

**Format**  
ESC \*

LPRINT CHR\$( 27); "\*" ; (m) (n1 n2) (d1 d2 d3 . . . dn);

4.2

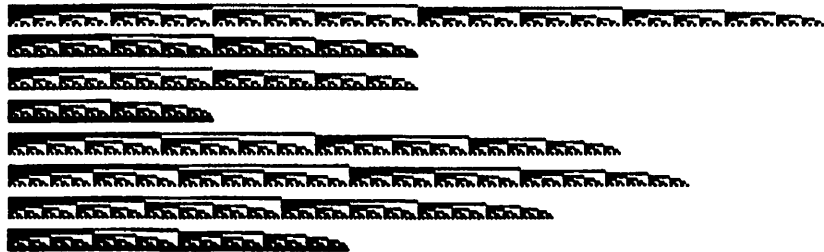
### Example

Set the number of data to 256 dots; then print the data from FF to 00.  
The order of horizontal DPI is as follows; 60, 120, 120 (Half), 240 (Half), 80,  
72, 92 and 144.

### «Sample Program»

```
10 FOR N=0 TO 7
20 LPRINT CHR$(27);"*";CHR$(N);CHR$(0);CHR$(1);
30 FOR M=255 TO 0 STEP -1
40 LPRINT CHR$(M);
50 NEXT M
60 LPRINT
70 NEXT N
```

### «Printing»



### ESC ? (n1 n2)

Hex. code	1B 3F (n1 n2)
Dec. code	27 63 (n1 n2)

After receiving the ESC ? code, change ESC K, L, Y or Z to the ESC \* (m) mode.

\*n1: The variable is a character K, L, Y or Z.

\*n2: The value of m is specified; m varies according to ESC \* (m).

Example: If ESC K is changed to ESC \*3.

```

n1=K
n2=3  ] reassigned
ESC ? K 3
{1B 2F 4B 03}

```

Consequently ESC K becomes equivalent to ESC \*3.

4.2

#### Format

ESC ? LPRINT CHR\$(27); "?"; (n1 n2);

#### Example

Set the horizontal DPI to 60 by the ESC K code. Print 256 columns of FF. Change the ESC K code to the horizontal DPI mode by the ESC ? code; then print 256 columns of FF again by ESC K.

#### «Sample Program»

```

10 LPRINT CHR$(27); "K"; CHR$(0); CHR$(1);
20 FOR N=0 TO 255:LPRINT CHR$(255);:NEXT N
30 LPRINT
40 '
50 LPRINT CHR$(27); "?"; "K"; CHR$(3);
60 LPRINT CHR$(27); "K"; CHR$(0); CHR$(1);
70 FOR N=0 TO 255:LPRINT CHR$(255);:NEXT N
80 LPRINT

```

#### «Printing»



ESC ^ (m) (n1 n2) (d11 d12 . . . dn1 dn2)

Hex. code

1B 5E (m) (n1 n2) (d11 d12 . . . dn1 dn2)

Dec. code

27 94 (m) (n1 n2) (d11 d12 . . . dn1 dn2)

This code selects the 9-pin bit image graphic mode. The horizontal pitch (either 60 or 120 DPI) is specified by m. n1n2 specifies the number of 9-dot columns to be printed. But since one 9-dot column is composed of two bytes, the actual number of data bytes to be sent is twice the number specified by n1n2. The actual data bytes are represented by d11 d12 ... dn1 dn2. The data length setting method is described below.

- ① When the data length is 255 bytes or fewer, n2 is 0. Set the data length in n1.

**Example** When the data length is 20 bytes:

n1=20

n2=0

4.2

- ② When the data length is 256 bytes or more, the result (discard the figures below the decimal point) obtained by dividing the data length by 256 bytes is put in n2, and the remainder in n1.

**Example** When the data length is 300 bytes:

$$\begin{array}{r} 1 \dots n2 \\ 256 \overline{) 300} \\ \underline{256} \\ 44 \dots n1 \end{array}$$

The value of m specifies the horizontal DPI as follows.

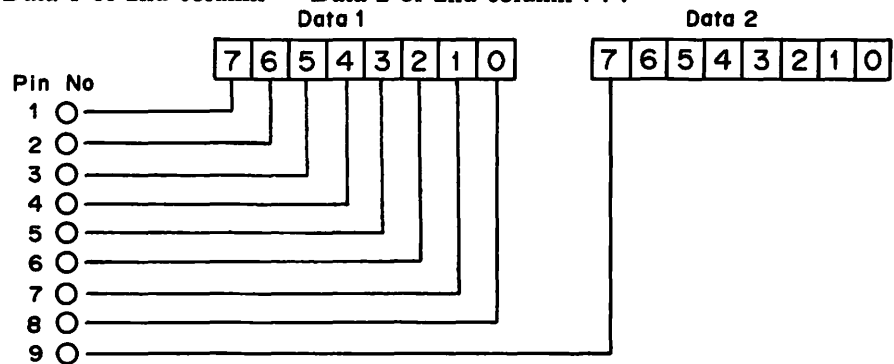
m	BIT IMAGE DENSITY
0	60 DPI
1	120 DPI

The configuration of data is as follows.

The data is sent in the following order:

Data 1 of 1st column → Data 2 of 1st column . . .

Data 1 of 2nd column → Data 2 of 2nd column . . .



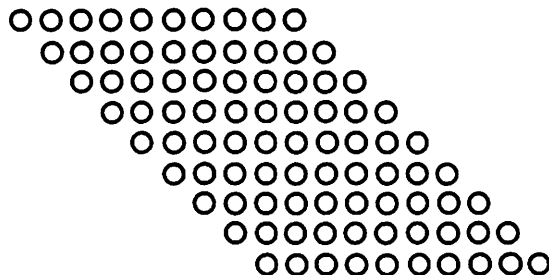
#### Format

ESC ^

LPRINT CHR\$(27); "^"; (m) (n1 n2) (d11 d12 . . . dn1 dn2);

#### Example

Print as shown below.



#### «Sample Program»

```

10 LPRINT CHR$(27); "^";CHR$(0);CHR$(18);CHR$(0);
20 LPRINT CHR$(128);CHR$(0 );CHR$(192);
   CHR$(0 );CHR$(224);CHR$(0 );
30 LPRINT CHR$(240);CHR$(0 );CHR$(248);
   CHR$(0 );CHR$(252);CHR$(0 );
40 LPRINT CHR$(254);CHR$(0 );CHR$(255);
   CHR$(0 );CHR$(255);CHR$(128);
50 LPRINT CHR$(255);CHR$(128);CHR$(127);
   CHR$(128);CHR$(63 );CHR$(128);
60 LPRINT CHR$(31 );CHR$(128);CHR$(15 );
   CHR$(128);CHR$(7 );CHR$(128);
70 LPRINT CHR$(3 );CHR$(128);CHR$(1 );
   CHR$(128);CHR$(0 );CHR$(128);

```

#### «Printing»

	ESC : NUL NUL NUL				
Hex. code	1B	3A	00	00	00
Dec. code	27	58	0	0	0

When the ESC : code is received, the internal CG is copied into the download area.  
The DP (NLQ2) CG is copied when the DP mode is currently selected, while the NLQ1 CG is copied when the NLQ mode is selected.

Format

ESC : NUL NUL NUL      LPRINT CHR\$ (27); " : "; CHR\$ (0); CHR\$ (0); CHR\$ (0);

Example

Initially, try to print "A~G" three times: the first and third times choose the ROM CG; the second time choose the RAM download area. Next, copy the ROM CG to the download area and try the above printing sequence again.

«Sample Program»

```
100 FOR N=65 TO 71 :LPRINT CHR$(N) ; :NEXT
110 LPRINT CHR$(27) ; "%" ; CHR$(1) ; CHR$(0) ;
120 FOR N=65 TO 71 :LPRINT CHR$(N) ; :NEXT
130 LPRINT CHR$(27) ; "%" ; CHR$(0) ; CHR$(0) ;
140 FOR N=65 TO 71 :LPRINT CHR$(N) ; :NEXT
150 LPRINT CHR$(27) ; " : " ; CHR$(0) ; CHR$(0) ; CHR$(0)
160 FOR N=65 TO 71 :LPRINT CHR$(N) ; :NEXT
170 LPRINT CHR$(27) ; "%" ; CHR$(1) ; CHR$(0) ;
180 FOR N=65 TO 71 :LPRINT CHR$(N) ; :NEXT
190 LPRINT CHR$(27) ; "%" ; CHR$(0) ; CHR$(0) ;
200 FOR N=65 TO 71 :LPRINT CHR$(N) ; :NEXT
```

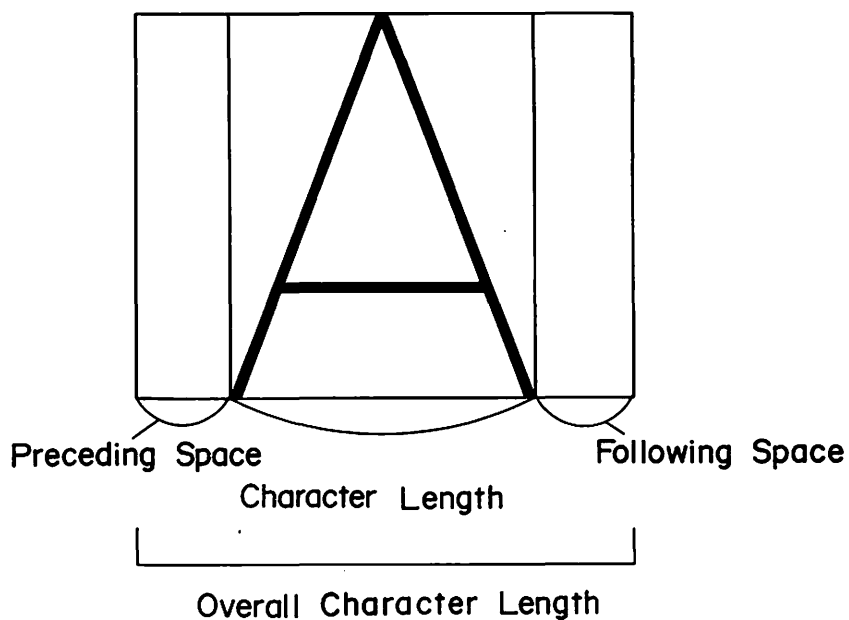
«Printing»

ABCDEFGH      ABCDEFGH  
ABCDEFGHABCDEFGHABCDEFGH



	<b>ESC &amp;</b>
<b>Hex. code</b>	<b>1B 26</b>
<b>Dec. code</b>	<b>27 38</b>

### Configuration of character



This code starts downloading. Download characters are defined by the following codes.

#### NOTE:

Set DIP-SW No. 1-6 and 1-7 in download buffer condition to start downloading. The configuration of a download character is shown below.

ESC &	q	n1	n2	a (n)	d1	d2 ~ dn
	①	②	③		④	

① Print quality setting

DP character set: q=NUL (00)

NLQ character set: q=STX (02)

② Setting of character code

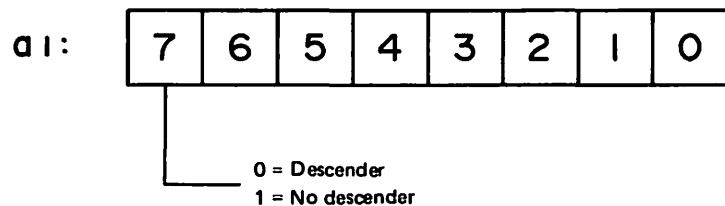
Set the first character to be loaded as n, and the last character as n2. If only one character is to be loaded, set n1=n2. The following items (③ and ④) should be repeated for each downloaded character.

③ Attribute and character length

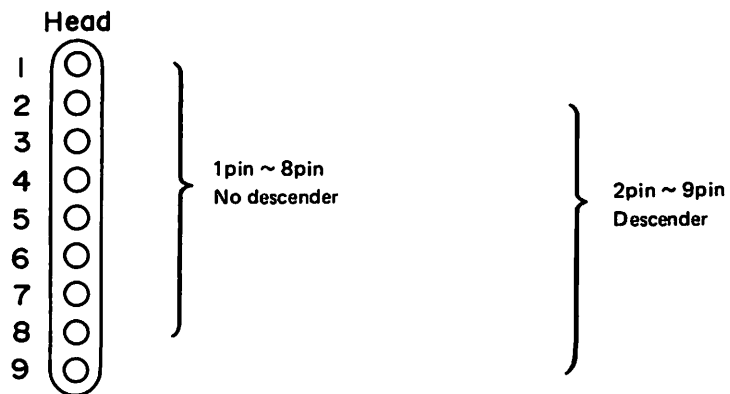
DP character set: a (n) — 1 byte as explained in a1

NLQ character set: a (n) — 3 bytes as explained in a1, a2, a3

Attribute is set with the MSB (the 7th bit) of a1 both in DP and NLQ.



4.2



Descender

The head pins from 1 to 8 are used when printing normal characters.

The head pins from 2 to 9 are used when printing descending characters such as “g” and “y”.

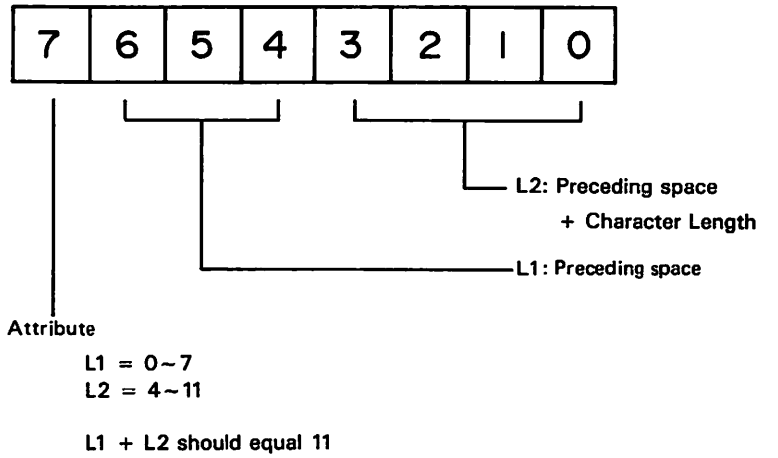
Character length

DP horizontal 11 dots

NLQ horizontal 23 dots

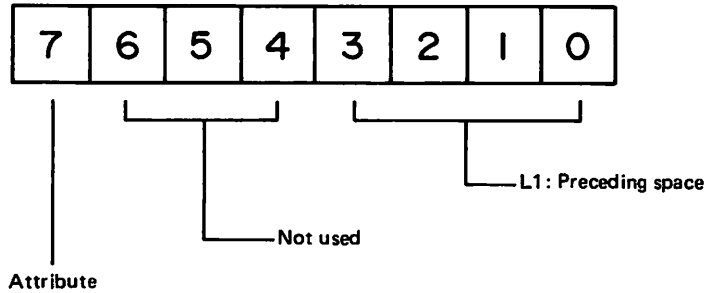
# DP Mode

a1:

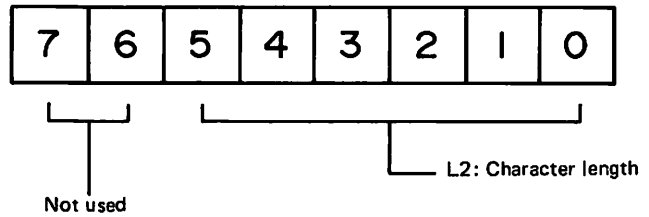


# NLQ Mode

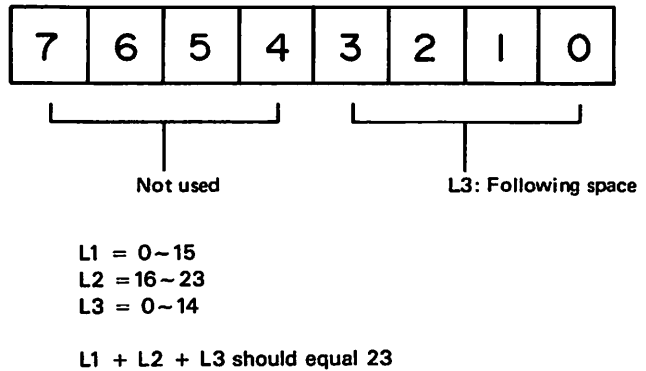
a1:



a2:



a3:



④ Data

DP 11 bytes × the number of characters

NLQ 46 bytes × the number of characters

(As the character length is 23 dots and 2-pass printing is used in the NLQ mode, 46 bytes are needed for one character.)

**Format**

ESC &

**DP Mode**

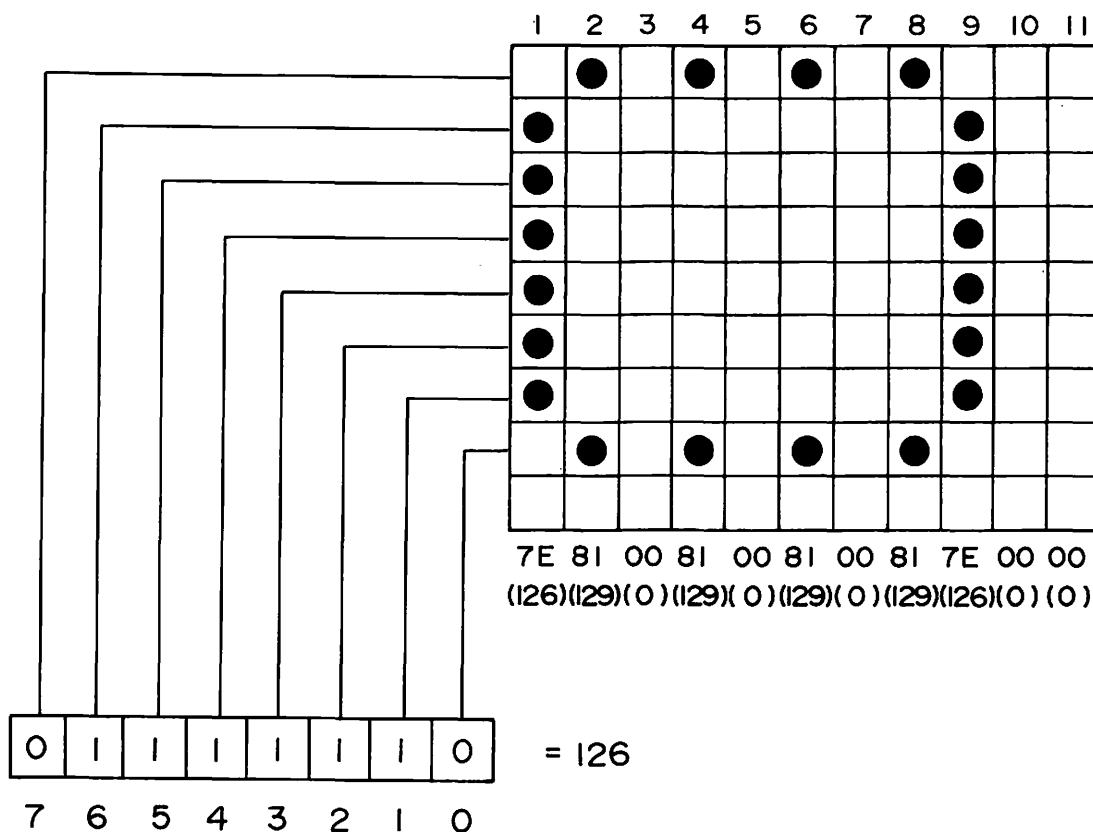
LPRINT CHR\$ (27); "&"; (q) (n1 n2) (a) (d1 d2 . . . dn);

**NLQ Mode**

LRPINT CHR\$ (27); "&"; (q) (n1 n2) (a1 a2 a3) (d1 d2 ... dn);

**Example**

Design a character and find the byte value for each column as shown below.  
In this case, a DP character is used.



After the values for the columns have been found, the following program downloads this character twice: the first time as a normal character (lines 140 ~ 170); and the second time as a descending character (lines 180 ~ 210). Line 140 sends a value which corresponds to a1 and which sets the MSB=1 (No Descender). Line 180 also sends a value which corresponds to a1 (for the second character) and which sets the MSB=0 (Descender).

«Sample Program»

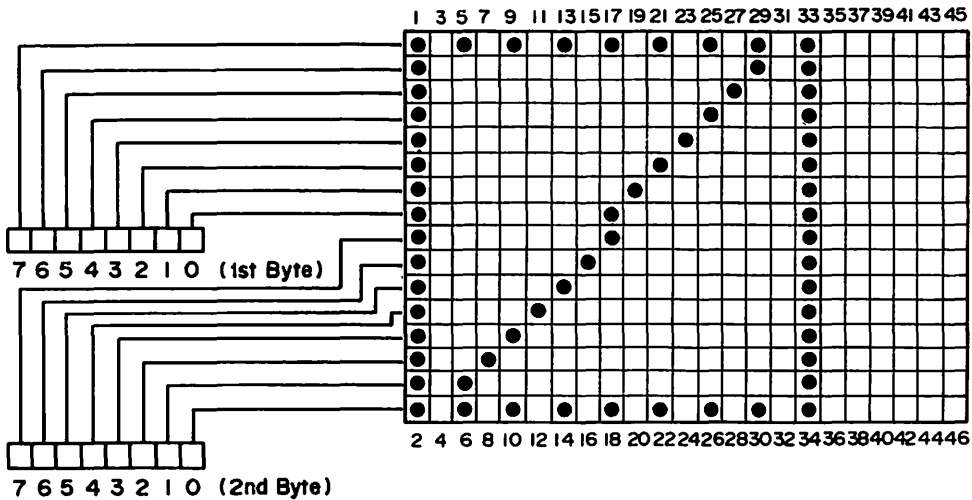
```
100 LPRINT CHR$(27);"&";
110 LPRINT CHR$(0);
120 LPRINT "A";
130 LPRINT "B";
140 LPRINT CHR$(137);
150 LPRINT CHR$(126);CHR$(129);CHR$(0 );
    CHR$(129);
160 LPRINT CHR$(0 );CHR$(129);CHR$(0 );
    CHR$(129);
170 LPRINT CHR$(126);CHR$(0 );CHR$(0 );
180 LPRINT CHR$(9 );
190 LPRINT CHR$(126);CHR$(129);CHR$(0 );
    CHR$(129);
200 LPRINT CHR$(0 );CHR$(129);CHR$(0 );
    CHR$(129);
210 LPRINT CHR$(126);CHR$(0 );CHR$(0 );
220 LPRINT CHR$(27);"%" ;CHR$(1);CHR$(0);
    "AAABBB"
```

«Printing»

000000

### Example

Define a character and find the byte value for each column as shown below. Take note that since horizontally adjacent dots can't be printed in Download mode, the character is defined by placing horizontal dots in every other column. In this case, a NLQ character is used.



As for NLQ mode, the number of vertical dots is 16.

Data is input in this order: the 1st upper byte then the 1st lower byte, the 2nd upper byte then the 2nd lower byte. This sequence is continued until the end of the downloaded character is reached.

**«Sample Program»**

```
100 LPRINT CHR$(27);"×";CHR$(1);
110 LPRINT CHR$(27);"&";CHR$(2);
120 LPRINT "A";
130 LPRINT "A";
140 LPRINT CHR$(128);
150 LPRINT CHR$(17);
160 LPRINT CHR$(6);
170 LPRINT CHR$(255);CHR$(255);CHR$(0);CHR$(0);
180 LPRINT CHR$(128);CHR$(3);CHR$(0);CHR$(4);
190 LPRINT CHR$(128);CHR$(9);CHR$(0);CHR$(16);
200 LPRINT CHR$(128);CHR$(33);CHR$(0);CHR$(64);
210 LPRINT CHR$(129);CHR$(129);CHR$(2);CHR$(0);
220 LPRINT CHR$(132);CHR$(1);CHR$(8);CHR$(0);
230 LPRINT CHR$(144);CHR$(1);CHR$(32);CHR$(0);
240 LPRINT CHR$(192);CHR$(1);CHR$(0);CHR$(0);
250 LPRINT CHR$(255);CHR$(255);CHR$(0);CHR$(0);
260 LPRINT CHR$(0);CHR$(0);CHR$(0);CHR$(0);
270 LPRINT CHR$(0);CHR$(0);CHR$(0);CHR$(0);
280 LPRINT CHR$(0);CHR$(0);
290 LPRINT CHR$(27);"%" ;CHR$(1);CHR$(0);"AAA"
```

**«Printing»****000**

	ESC % NUL NUL				ESC % SOH NUL			
Hex. code	1B	25	00	00	1B	25	01	00
Dec. code	27	37	0	0	27	37	1	0

When the ESC % NUL NUL code is received, the built-in CG is selected and printing can be performed with the normal ROM character set.

When the ESC % SOH NUL is received, the expanded CG is selected and printing can be performed with downloaded or copied characters. If characters with codes that haven't been downloaded or copied are to be printed, only spaces will be printed.

Format

Dec. data	LPRINT CHR\$ (27); "%"; CHR\$ (0); CHR\$ (0);
Dec. data	LPRINT CHR\$ (27); "%"; CHR\$ (1); CHR\$ (0);

4.2

Example

The built-in CG is selected by sending ESC % NUL NUL code and normal ROM characters are printed. Then the expanded CG is selected by ESC % SOH NUL and downloaded characters made by the ESC & code are printed. Finally, the built-in CG is selected again and normal ROM characters are printed.



«Sample Program»

```

1000 LPRINT CHR$(27);"x";CHR$(1);
1010 LPRINT CHR$(27);"&";CHR$(2);
1020 LPRINT "e";
1030 LPRINT "e";
1040 LPRINT CHR$(128);CHR$(22);CHR$(1);
1050 LPRINT CHR$(255);CHR$(255);CHR$(0);CHR$(0);
1070 LPRINT CHR$(128);CHR$(1);CHR$(0);CHR$(0);
1080 LPRINT CHR$(128);CHR$(3);CHR$(0);CHR$(4);
1090 LPRINT CHR$(128);CHR$(9);CHR$(0);CHR$(16);
1100 LPRINT CHR$(128);CHR$(33);CHR$(0);CHR$(64);
1110 LPRINT CHR$(129);CHR$(129);CHR$(130);CHR$(0);
1120 LPRINT CHR$(132);CHR$(1);CHR$(8);CHR$(0);
1130 LPRINT CHR$(144);CHR$(1);CHR$(32);CHR$(0);
1140 LPRINT CHR$(192);CHR$(1);CHR$(0);CHR$(0);
1150 LPRINT CHR$(128);CHR$(1);CHR$(0);CHR$(0);
1160 LPRINT CHR$(128);CHR$(1);CHR$(127);CHR$(254);
1170 LPRINT CHR$(0);CHR$(0);
1180 LPRINT CHR$(27);"%" ;CHR$(0);CHR$(0);"eee";
1190 LPRINT CHR$(27);"%" ;CHR$(1);CHR$(0);"eee";
1200 LPRINT CHR$(27);"%" ;CHR$(0);CHR$(0);"eee"
1210 END

```

«Printing»

eeeZZZeee

**ESC R (n)**

**Hex. code**                      **1B 52 (n)**

**Dec. code**                      **27 82 (n)**

When the ESC R code is received, the international characters are selected.  
The value of (n) varies from NUL to SI according to the following table.

COMMAND	DECIMAL NOTATION	HEX NOTATION	FUNCTION
ESC R NUL	27 82 00	1B 52 00	USA (AMERICAN)
ESC R SOH	27 82 01	1B 52 01	FR (FRENCH)
ESC R STX	27 82 02	1B 52 02	GE (GERMAN)
ESC R ETX	27 82 03	1B 52 03	BR (BRITISH)
ESC R EOT	27 82 04	1B 52 04	DN (DANISH)
ESC R ENQ	27 82 05	1B 52 05	SW (SWEDISH)
ESC R ACK	27 82 06	1B 52 06	IT (ITALIAN)
ESC R BEL	27 82 07	1B 52 07	SP (SPANISH)
ESC R BS	27 82 08	1B 52 08	JA (JAPANESE)
ESC R HT	27 82 09	1B 52 09	NOR (NORWEGIAN)
ESC R LF	27 82 10	1B 52 0A	DN2 (DANISH 2)
ESC R VT	27 82 11	1B 52 0B	AF (AFRIKAANS)
ESC R FF	27 82 12	1B 52 0C	DU (DUTCH)
ESC R CR	27 82 13	1B 52 0D	FRC (FRENCH CANADIAN)
ESC R SO	27 82 14	1B 52 0E	FR2 (FRENCH 2)
ESC R SI	27 82 15	1B 52 0F	BR2 (BRITISH 2)

**DIP-SW**

**DIP-SW No. 2-3, 2-4, 2-5, 2-6**

No. HEX	0 23	1 24	2 40	3 5B	4 5C	5 5D	6 5E	7 60	8 7B	9 7C	10 7D	11 7E
USA	#	\$	@	[	\	]	^	`	{		}	~
FR			à	°	ç	§			é	ù	è	''
GE			§	Ä	Ö	Ü			ä	ö	ü	ß
UK	£											
DN				Æ	Φ	Å			æ	ø	å	
SW		☉	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
IT				°		é		ù	à	ò	è	ì
SP	Pt			í	Ñ	¿			''	ñ		
JA					¥							
NOR		☉	É	Æ	Φ	Å	Ü	é	æ	ø	å	ü
DN2			É	Æ	Φ	Å	Ü	é	æ	ø	å	ü
AF		ê	É	Ê	Ö	è	Û	é	ë	ö	ô	ü
DU					IJ					ij		
FRC			à	â	ç	ê	î	ô	é	ú	è	û
FR2		â	à	î	ç	ê	û	ô	é	ú	è	ï
UK2		£										

NOTE: The characters for the blank boxes are the same as the corresponding US characters.

### Format

ESC R

LPRINT CHR\$ (27); "R"; (n);

### Example

Sequentially print out international characters by sending the ESC R code.

# «Sample Program»

```

100 A$="# $ @ [ \ ] ^ ` { | } ~"
110 LPRINT CHR$(27);"R";CHR$(0);" AMERICAN ";A$
120 LPRINT CHR$(27);"R";CHR$(1);" FRENCH ";A$
130 LPRINT CHR$(27);"R";CHR$(2);" GERMAN ";A$
140 LPRINT CHR$(27);"R";CHR$(3);" BRITISH ";A$
150 LPRINT CHR$(27);"R";CHR$(4);" DANISH ";A$
160 LPRINT CHR$(27);"R";CHR$(5);" SWEDISH ";A$
170 LPRINT CHR$(27);"R";CHR$(6);" ITALIAN ";A$
180 LPRINT CHR$(27);"R";CHR$(7);" SPANISH ";A$
190 LPRINT CHR$(27);"R";CHR$(8);" JAPANESE ";A$
200 LPRINT CHR$(27);"R";CHR$(9);" NORWEGIAN ";A$
210 LPRINT CHR$(27);"R";CHR$(10);" DANISH2 ";A$
220 LPRINT CHR$(27);"R";CHR$(11);" AFRIKAANS ";A$
230 LPRINT CHR$(27);"R";CHR$(12);" DUTCH ";A$
240 LPRINT CHR$(27);"R";CHR$(13);"FRENCH CANADIAN ";A$
250 LPRINT CHR$(27);"R";CHR$(14);" FRENCH2 ";A$
260 LPRINT CHR$(27);"R";CHR$(15);" BRITISH2 ";A$

```

# «Printing»

```

AMERICAN # $ @ [ \ ] ^ ` { | } ~
FRENCH # $ à ¸ ç é ê ë ù
GERMAN # $ ä ö ü ã ö ü ß
BRITISH £ $ @ [ \ ] ^ ` { | } ~
DANISH # $ @ æ ø Å Æ Ø å
SWEDISH # Ö É Ä Ö Å Ü é ä ö å ü
ITALIAN # $ @ ¸ \ é ^ ù à ó è ì
SPANISH ₧ $ @ ¡ Ñ ¿ ^ ` ¨ Ñ } ~
JAPANESE # $ @ [ ¥ ] ^ ` { | } ~
NORWEGIAN # Ö É Æ Ø Å Ü é æ ø å ü
DANISH2 # $ É Æ Ø Å Ü é æ ø å ü
AFRIKAANS # @ é é ö é ü é è ö ö ü
DUTCH # $ @ [ ſ ] ^ ` { | } ~
FRENCH CANADIAN # $ à á ç @ î ô é ú é ü
FRENCH2 # à á ç @ ü ö é ú é ì
BRITISH2 # £ @ [ \ ] ^ ` { | } ~

```

# ESC # ESC = ESC >

## MSB Control Codes

	ESC #	ESC =	ESC >
Hex. code	1B 23	1B 3D	1B 3E
Dec. code	27 35	27 61	27 62

When the ESC # code is received, the MSB control set by ESC =, ESC > is cleared.

When the ESC = code is received, the highest bit (MSB) of the character code is set to 0. Consequently all codes from (80) H to (FF) H become equivalent to those from (00) H to (7F) H.

When the ESC > code is received, the highest bit (MSB) is set to 1. Consequently all codes from (00) H to (7F) H become equivalent to those from (80) H to (FF) H.

NOTE:

These three commands affect print data only.

### Format

ESC # LPRINT CHR\$(27); "#";

ESC = LPRINT CHR\$(27); "=";

ESC > LPRINT CHR\$(27); ">";

### Example

Print 160~192 (A0H~C0H) in the ASCII code table. After sending the ESC = code, again print 160~192 (A0H~C0H). Clear the setting of the ESC = code with the ESC # code and then send 32~64 (20H~40H) in the ASCII code table. After sending the ESC > code, again print 32~64 (20H~40H).

### «Sample Program»

```
100 FOR N=160 TO 192
110 LPRINT CHR$(N) ;
120 NEXT N
130 LPRINT
140 LPRINT CHR$(27) ; "=" ;
150 FOR N= 160 TO 192
160 LPRINT CHR$(N) ;
170 NEXT N
180 LPRINT CHR$(27) ; "#"
190 FOR N=32 TO 64
200 LPRINT CHR$(N) ;
210 NEXT N
220 LPRINT
230 LPRINT CHR$(27) ; ">" ;
240 FOR N=32 TO 64
250 LPRINT CHR$(N) ;
260 NEXT N
270 LPRINT
```

4.2

### «Printing»

```
!"#$%&'()*+,-./0123456789:;<=>?@
!"#$%&'()*+,-./0123456789:;<=>?@
!"#$%&'()*+,-./0123456789:;<=>?@
!"#$%&'()*+,-./0123456789:;<=>?@
```

**ESC 6**  
**ESC 7**

## Upper Code Area Control

	ESC 6		ESC 7	
Hex. code	1B	36	1B	37
Dec. code	27	54	27	55

When the ESC 6 code is received, the characters assigned to codes 128~159 (80H~9FH) and 255 (FFH) can be printed. These codes include international characters. The ESC 6 code is effective until the ESC 7 code is received.

## Format

**ESC 6** **LPRINT CHR\$ (27); "6";**

**ESC 7**                      **LPRINT CHR\$ (27); "7";**

128	129	130	131	132	133	134	135	136	137	138
à	é	ù	ò	í	°	£	í	¿	ñ	ñ
139	140	141	142	143	144	145	146	147	148	149
x	R	A	ä	ç	š	ð	æ	æ	ø	ø
150	151	152	153	154	155	156	157	158	159	255
..	Ä	Ö	Ü	ä	ö	ü	É	é	Ý	ø

### Example

128~159 (80H~9FH) and can be printed by sending the ESC 6 code.

### «Sample Program»

```
10 LPRINT CHR$(27);"6";
20 FOR N=128 TO 159
30 LPRINT CHR$(N);
40 NEXT N
50 LPRINT
```

**«Printing»**

delv00i f1cNñ0fAaC5Bf200 ADUaouEe#

ESC I (n)

Hex. code            1B   49   (n)

Dec. code            27   73   (n)

n=1: The character with codes 0 (00H) to 31 (1FH) and codes 128 (80H) to 159 (9FH) can be printed.  
n=0: Clears the code area.

Format

ESC I

LPRINT CHR\$(27); "I"; (n);

0	1	2	3	4	5	6	16	17
à	è	ù	ò	ì	·	£	§	ß
21	22	23	26	28	29	30	31	
ø	·	Ä	ä	ü	é	é	¥	

4.2

Example

After sending "A", print 0~6, 16, 17, 21~23, 26, 28~31 of the ASCII code table. Send ESC I, then print out the above mentioned data again.

«Sample Program»

```
10 A$=""
20 FOR N=0 TO 6:A$=A$+CHR$(N):NEXT N
30 FOR N=16 TO 17:A$=A$+CHR$(N):NEXT N
40 FOR N=21 TO 23:A$=A$+CHR$(N):NEXT N
50 A$=A$+CHR$(26)
60 FOR N=28 TO 31:A$=A$+CHR$(N):NEXT N
70 LPRINT "A";A$
80 LPRINT CHR$(27);"I";CHR$(1);
90 LPRINT "A";A$
```

«Printing»

A
Aàèùòì·£§ßø·Ääüéé¥



**ESC <****Hex. code****1B 3C****Dec. code****27 60**

When this code is received, the print head will return to the mechanical left-most position regardless of the left margin. This code must be sent at the head of a line or it will be invalid.

**Format****ESC <****LPRINT CHR\$ (27); "<";**

## 4.2.4 Character Control Codes

The character control codes, each consisting of a few bytes, give variety to characters.

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Emphasized Print	ESC E	1B 45	27 69	Set emphasized print	4-132
	ESC F	1B 46	27 70	Clear emphasized print	4-132
Double Strike Print	ESC G	1B 47	27 71	Set double strike print	4-133
	ESC H	1B 48	27 72	Clear double strike print	4-133
Underline	ESC — . SOH	1B 2D 01	27 45 1	Start underline	4-134
	ESC — NUL	1B 2D 00	27 45 0	Stop underline	4-134
Super/ Subscript Character	ESC S NUL	1B 53 00	27 83 0	Superscript character command	4-135
	ESC S SOH	1B 53 01	27 83 1	Subscript character command	4-135
	ESC T	1B 54	27 84	Clear super/subscript characters	4-135
Double Width Print	ESC W SOH	1B 57 01	27 87 1	Select double width characters	4-136
	ESC W NUL	1B 57 00	27 87 0	Clear double width characters	4-136
Combination Print	ESC !	1B 21	27 33	Set print mode	4-137
Italic Print	ESC 4	1B 34	27 52	Set italic print	4-141
	ESC 5	1B 35	27 53	Clear italic print	4-141
Proportional Spacing	ESC p SOH	1B 70 01	27 112 1	Set proportional spacing	4-142
	ESC p NUL	1B 70 00	27 112 0	Clear proportional spacing	4-142
Dot Spacing	ESC (SP)	1B 20	27 32	Set dot spacing	4-144
Dot Position	ESC \$	1B 24	27 36	Set absolute dot position	4-145
	ESC \	1B 5C	27 92	Set relative dot position	4-146

# ESC E ESC F

## Set/Clear Emphasized Print

	ESC E	ESC F
Hex. code	1B 45	1B 46
Dec. code	27 69	27 70

The ESC E code sets emphasized print. The ESC F code clears emphasized print.

### Format

ESC E                    **LPRINT CHR\$(27); "E";**

ESC F                    **LPRINT CHR\$(27); "F";**

### Example

After printing "ABCDEF", set emphasized print and print "GHIJKL." Then clear emphasized print and print "MNOPQR."

### «Sample Program»

```
10 LPRINT "ABCDEF";CHR$(27);"E GHIJKL";  
20 LPRINT CHR$(27);"F MNOPQR"
```

### «Printing»

ABCDEF **GHIJKL** MNOPQR

ESC G  
ESC H

Set/Clear Double Strike Print

	ESC G	ESC H
Hex. code	1B 47	1B 48
Dec. code	27 71	27 72

Double strike print performs printing in two passes of the print head. The ESC G code sets double strike print. The ESC H code clears double strike print.

Format

ESC G                   LPRINT CHR\$ (27); "G";  
ESC H                   LPRINT CHR\$ (27); "H";

Example

After printing "ABCDEF", set double strike print and print "GHIJKL." Then clear double strike print and print "MNOPQR."

«Sample Program»

```
10 LPRINT "ABCDEF" ;CHR$(27) ;"GGHIJKL" ;  
20 LPRINT CHR$(27) ;"HMNOPQR"
```

«Printing»

ABCDEFGHI JKLMNOPQR

# ESC – SOH ESC – NUL

## Start/Stop Underline Mode

	ESC – SOH				ESC – NUL		
Hex. code	1B	2D	01		1B	2D	00
Dec. code	27	45	1		27	45	0

The ESC – SOH code sets underlining. The ESC – NUL code clears underlining. These codes do not apply to the space set by horizontal tab.

### Format

ESC – SOH

```
LPRINT CHR$(27); “–”; CHR$(1);
```

ESC – NUL

```
LPRINT CHR$(27); “–”; CHR$(0);
```

### Example

After printing “ABCDEF”, send the underline set code and print “GHIJKL.” Then send the underline clear code and print “MNOPQR.”

### «Sample Program»

```
10 LPRINT "ABCDEF";CHR$(27);"–";CHR$(1);  
20 LPRINT "GHIJKL";CHR$(27);"–";CHR$(0);  
30 LPRINT "MNOPQR"
```

### «Printing»

ABCDEFGHIJKLMNOPQR

ESC S NUL

ESC S SOH

ESC T

Set/Clear Super/Subscript Characters

	ESC S NUL	ESC S SOH	ESC T
Hex. code	1B 53 00	1B 53 01	1B 54
Dec. code	27 83 0	27 83 1	27 84

These codes set or clear superscript or subscript character mode. The ESC S NUL code sets superscript character mode. The ESC S SOH sets subscript character mode. The ESC T code clears both superscript and subscript. The DP font is used for Super/Subscript in NLQ print mode. Superscript and subscript characters can't be printed simultaneously. The mode that is chosen last is the one that will become active.

Format

ESC S NUL	LPRINT CHR\$ (27); "S"; CHR\$ (0);
ESC S SOH	LPRINT CHR\$ (27); "S"; CHR\$ (1);
ESC T	LPRINT CHR\$ (27); "T";

Example

Print A to H in normal, superscript and subscript characters in this order. To clarify the difference between such charcters, underline the printed characters.

«Sample Program»

```

10 LPRINT CHR$(27); "-" ;CHR$(1) ;
20 LPRINT "ABCDEFGH"
30 LPRINT CHR$(27); "S" ;CHR$(0) ; "ABCDEFGH"
40 LPRINT CHR$(27); "S" ;CHR$(1) ; "ABCDEFGH"
50 LPRINT CHR$(27); "T" ; "ABCDEFGH"
```

«Printing»

```

ABCDEFGH
ABCDEFGH
ABCDEFGH
ABCDEFGH
```

# ESC W SOH ESC W NUL

## Select/Clear Double Width Characters

	ESC W SOH			ESC W NUL		
Hex. code	1B	57	01	1B	57	00
Dec. code	27	87	1	27	87	0

The ESC W SOH code sets double width character mode. The ESC W NUL code clears double width character mode. The ESC W NUL code also clears the double width character mode which is set by the SO code.

### Format

ESC W SOH

LPRINT CHR\$(27); "W"; CHR\$(1);

ESC W NUL

LPRINT CHR\$(27); "W"; CHR\$(0);

### Example

Print "ABCDEFGH", send the ESC W SOH code, and print "1234567890". Then, send the CR code and print "ABCDEFGH" Next, send the ESC W NUL code and print "1234567890".

### «Sample Program»

```
10 LPRINT "ABCDEFGH";  
20 LPRINT CHR$(27); "W"; CHR$(1); "1234567890"  
30 LPRINT "ABCDEFGH"; CHR$(27); "W"; CHR$(0);  
   "1234567890"
```

### «Printing»

```
ABCDEFGH1234567890  
ABCDEFGH1234567890
```

**ESC ! (n)**

**Hex. code**

**1B 21 (n)**

**Dec. code**

**27      33      (n)**

When the ESC ! code is received, parameters just after this code perform the character control. Each control sequence is determined by the value of (n) and corresponds to the following table.

Bit	7	6	5	4	3	2	1	0
ON	Always 0		Enlarged	Double-strike	Empha-sized	Con-densed	Always 0	Elite
OFF			—	—	—	—		Pica

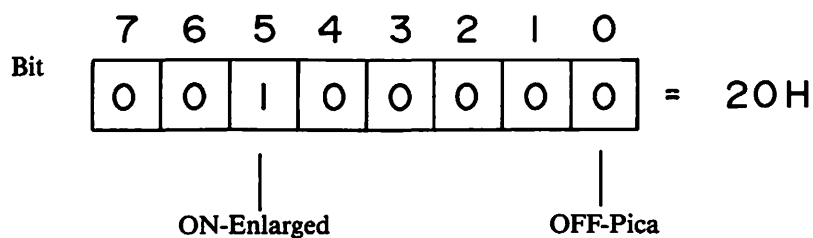
### Format

**ESC !**

**LPRINT CHR\$ (27); “!”; (n);**

4.2

**Example: When Enlarged pica characters are selected;**



ESC ! (20)  
1B 21 20



Example

N	En	D	Em	C	Pica
0					○
2					○
4				○	○
6				○	○
8		○			○
10		○			○
12			○	○	○
14			○	○	○
16		○			○
18		○			○
20		○		○	○
22		○		○	○
24		○	○		○
26		○	○		○
28		○	○	○	○
30		○	○	○	○
32	○				○
34	○				○
36				○	○
38	○			○	○
40	○		○		○
42	○		○		○
44	○		○	○	○
46	○		○	○	○
48	○	○			○
50	○	○		○	○
52	○	○		○	○
54	○	○		○	○
56	○	○	○		○
58	○	○	○		○
60	○	○	○	○	○
62	○	○	○	○	○

N	En	D	Em	C	Elite
1					○
3					○
5				○	○
7				○	○
9		○			○
11		○			○
13			○	○	○
15			○	○	○
17		○			○
19		○			○
21		○		○	○
23		○		○	○
25		○	○		○
27		○	○		○
29		○	○	○	○
31		○	○	○	○
33	○				○
35	○				○
37	○			○	○
39	○			○	○
41	○		○		○
43	○		○		○
45	○		○	○	○
47	○		○	○	○
49	○	○			○
51	○	○		○	○
53	○	○		○	○
55	○	○		○	○
57	○	○	○		○
59	○	○	○		○
61	○	○	○	○	○
63	○	○	○	○	○

En: Enlarged  
D: Double-strike  
Em: Emphasized  
C: Condensed

## Pica Combination Printing

### «Sample Program»

```
10 FOR N=0 TO 63 STEP 2
20 LPRINT USING "N=##  " ;N;
30 LPRINT CHR$(27);"!" ;CHR$(N) ;"ABCD"
40 LPRINT CHR$(27);"!" ;CHR$(0) ;
50 NEXT
```

### «Printing»

```
N= 0  ABCD
N= 2  ABCD
N= 4  ABCD
N= 6  ABCD
N= 8  ABCD
N=10  ABCD
N=12  ABCD
N=14  ABCD
N=16  ABCD
N=18  ABCD
N=20  ABCD
N=22  ABCD
N=24  ABCD
N=26  ABCD
N=28  ABCD
N=30  ABCD
N=32  ABCD
N=34  ABCD
N=36  ABCD
N=38  ABCD
N=40  ABCD
N=42  ABCD
N=44  ABCD
N=46  ABCD
N=48  ABCD
N=50  ABCD
N=52  ABCD
N=54  ABCD
N=56  ABCD
N=58  ABCD
N=60  ABCD
N=62  ABCD
```

## Elite Combination Printing

### «Sample Program»

```
10 FOR N=1 TO 63 STEP 2
20 LPRINT USING "N=##  ";N;
30 LPRINT CHR$(27);"!" ;CHR$(N) ;"ABCD"
40 LPRINT CHR$(27);"!" ;CHR$(0) ;
50 NEXT
```

### «Printing»

```
N= 1  ABCD
N= 3  ABCD
N= 5  ABCD
N= 7  ABCD
N= 9  ABCD
N=11  ABCD
N=13  ABCD
N=15  ABCD
N=17  ABCD
N=19  ABCD
N=21  ABCD
N=23  ABCD
N=25  ABCD
N=27  ABCD
N=29  ABCD
N=31  ABCD
N=33  ABCD
N=35  ABCD
N=37  ABCD
N=39  ABCD
N=41  ABCD
N=43  ABCD
N=45  ABCD
N=47  ABCD
N=49  ABCD
N=51  ABCD
N=53  ABCD
N=55  ABCD
N=57  ABCD
N=59  ABCD
N=61  ABCD
N=63  ABCD
```

ESC 4  
ESC 5

Set/Clear Italic Mode

	ESC 4	ESC 5
Hex. code	1B 34	1B 35
Dec. code	27 52	27 53

When the ESC 4 code is received, characters will become italicized. The italic mode is effective until the ESC 5 is received.

Format

ESC 4	LPRINT CHR\$ (27); "4";
ESC 5	LPRINT CHR\$ (27); "5";

Example

Print "1234567890".  
Send ESC 4, then print "1234567890".  
Clear ESC 4 by sending ESC 5.  
Print "1234567890".

4.2

«Sample Program»

```
10 LPRINT "1234567890 ";CHR$(27);"4";  
   "1234567890 ";CHR$(27);"5";"1234567890"
```

«Printing»

1234567890 *1234567890* 1234567890

# ESC p SOH ESC p NUL

## Set/Clear Proportional Spacing

	ESC p SOH			ESC p NUL		
Hex. code	1B	70	01	1B	70	00
Dec. code	27	112	1	27	112	0

When this code sequence is received, subsequent characters are printed in proportional spacing mode. The ESC p SOH code sets proportional spacing. The ESC p NUL code clears proportional spacing.

### Format

ESC p SOH

LPRINT CHR\$ (27); "p"; CHR\$ (1);

ESC p NUL

LPRINT CHR\$ (27); "p"; CHR\$ (0);

### Example

Print in pica; then in proportional spacing. The same operations are repeated in Elite, Pica Condensed and Elite Condensed.

### «Sample Program»

```
10 LPRINT "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27);"p";CHR$(1)  
20 LPRINT "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27);"p";CHR$(0)  
30 LPRINT CHR$(27);"M";  
   "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27);"p";CHR$(1)  
40 LPRINT "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27);"p";CHR$(0)  
50 LPRINT CHR$(27);CHR$(15);  
   "abcdefghijklmnopqrstuvwxyz";  
   CHR$(27);"p";CHR$(1)  
60 LPRINT "abcdefghijklmnopqrstuvwxyz"
```

### «Printing»

```
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz  
abcdefghijklmnopqrstuvwxyz
```

**ESC (SP) (n)**

Hex. code	1B	20	(n)
-----------	----	----	-----

<b>Dec. code</b>	<b>27</b>	<b>32</b>	<b>(n)</b>
------------------	-----------	-----------	------------

**Insert n dot space between each character. Dot space varies according to the current selected pitch. (n) must be from 0 to 255.**

## Format

### ESC (SP)

```
LPRINT CHR$(27); "(SP)"; (n);
```

4.2

### Example

**Print “ABC”.**

**Expand dot spacing between A, B and C in 16-dot increments by sending ESC (SP) (n).**

### «Sample Program»

```
10 FOR N=0 TO 255 STEP 16
20 LPRINT CHR$(27);" ";CHR$(N);"ABC"
30 NEXT
```

## «Printing»

[illegible]

# ESC \$

## Select Absolute Dot Position

### ESC \$ (n1 n2)

Hex. code            1B    24    (n1 n2)

Dec. code           27    36    (n1 n2)

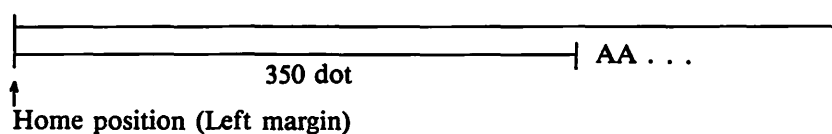
This command sets the next printing position to a point which is measured from the home position (left margin) by a specified number of dots. One dot is equal to 1/60" and the number of dots is specified by n1 n2. The maximum value of n1 n2 is 480. To find the value of n1 n2, the specified number of dots must be divided by 256: n2 holds the quotient and n1 holds the remainder as shown below.

The specified number of dots is 350:

$$\begin{array}{r} 1 \dots n2 \\ 256 \overline{) 350} \\ \underline{256} \\ 94 \dots n1 \end{array}$$

4.2

ESC \$ (94) (1)



### Format

ESC \$                    LPRINT CHR\$ (27); "\$"; (n1 n2);

### Example

Print "A" three times then set the next printing position to a point which is 350 dots to the right of the home position. Print "A" two more times.

### «Sample Program»

```
10 LPRINT "AAA" ;
20 LPRINT CHR$ (27) ; "$" ; CHR$ (94) ; CHR$ (1) ;
30 LPRINT "AA"
```

### «Printing»

AAA

AA



**ESC \ (n1 n2)**

**Hex. code**      **1B 5C (n1 n2)**

**Dec. code**      **27 92 (n1 n2)**

This command sets the next printing position to a point which is either to the left or to the right of the current printing position. The next printing position, which is measured in dots, is specified by n1 n2. One dot is 1/120". n1 n2 must hold a positive number to specify a position to the right of the current printing position. To specify a position to the left of the current printing position, the initial value of n1 n2 must be found and then the corresponding negative value must be substituted for the initial value. Corresponding negative values can be found by referring to the following chart. Notice that there are only four possible negative value for n2.

n1	negative equivalent	n2	negative equivalent
0	0	0	255
1	255	1	254
2	254	2	253
3	253	3	252
1	1		
255	1		

To find the initial value for n1 n2, the specified number of dots must be divided by 256: n2 holds the quotient and n1 holds the remainder as shown below.

The specified number of dots for setting the next printing position to the right of the current printing position is 280:

$$\begin{array}{r}
 1 \dots n2 \\
 256 \overline{) 280} \\
 \underline{256} \\
 24 \dots n1
 \end{array}$$

The specified number of dots for setting the next printing position to the left of the current printing position is 515:

$$\begin{array}{r}
 2 \dots 253 \text{ (negative equivalent)} \dots n2 \\
 256 \overline{) 515} \\
 \underline{512} \\
 3 \dots 253 \text{ (negative equivalent)} \dots n1
 \end{array}$$

### Format

ESC \

**LPRINT CHR\$ (27); "\"; (n1 n2);**

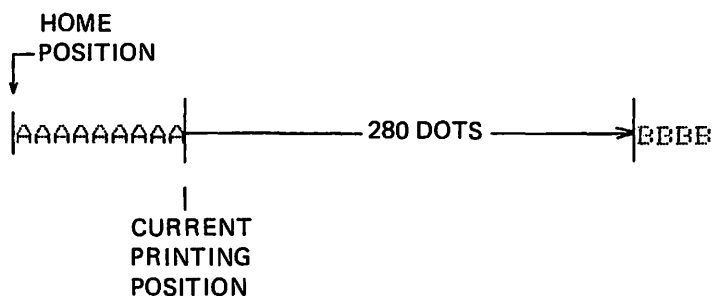
### Example

Print "A" nine times then set the next printing position to a point which is 280 dots to the right of the current printing position. Print "C" four times.

### «Sample Program»

```
10 LPRINT "AAAAAAAAA";  
20 LPRINT CHR$(27); "\"; CHR$(24); CHR$(1);  
30 LPRINT "BBBB"
```

### «Printing»



4.2

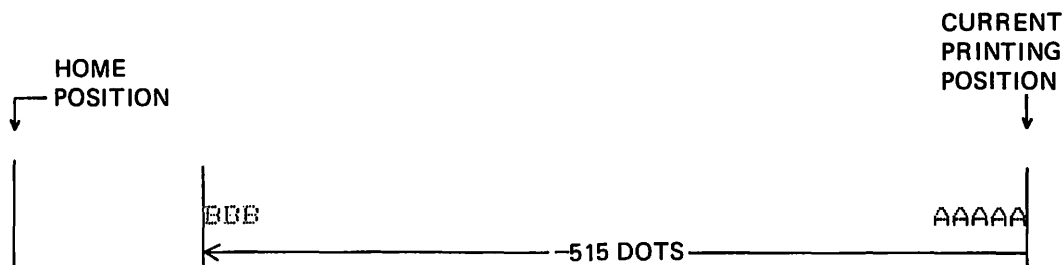
### Example

Print a space 54 times then print "A" five times. Set the next printing position to a point which is 515 dots to the left of the current printing position and then print "B" three times.

### «Sample Program»

```
10 FOR I=1 TO 54:LPRINT " "  
;:NEXT I:LPRINT "AAAAA";  
20 LPRINT CHR$(27); "\"; CHR$(253); CHR$(253);  
30 LPRINT "BBB"
```

### «Printing»



NOTE: Although the maximum number of dots that can be specified is 960, care must be taken when choosing a value for n1 n2. If you specify a dot position that exceeds the number of dots that are between the current printing position and the physical left and right margins of the printer, this command will be invalid.

---

## 4.2.5 System Control Codes

---

The system control codes, each consisting of a few bytes, select each system function.

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
PE De- tection	ESC 8	1B 38	27 56	PE ineffective	4-149
	ESC 9	1B 39	27 57	PE effective	4-149
Printer Reset	ESC @	1B 40	27 64	Printer reset	4-150

**ESC 8**  
**ESC 9**

**Set/Clear PE (Paper Empty) Detection**

	<b>ESC 8</b>	<b>ESC 9</b>
<b>Hex. code</b>	<b>1B 38</b>	<b>1B 39</b>
<b>Dec. code</b>	<b>27 56</b>	<b>27 57</b>

ESC 8 makes PE detection ineffective. ESC 9 makes PE detection effective.

**Format**

**ESC 8**                    **LPRINT CHR\$ (27); "8";**

**ESC 9**                    **LPRINT CHR\$ (27); "9";**

### ESC @

Hex. code	1B 40
Dec. code	27 64

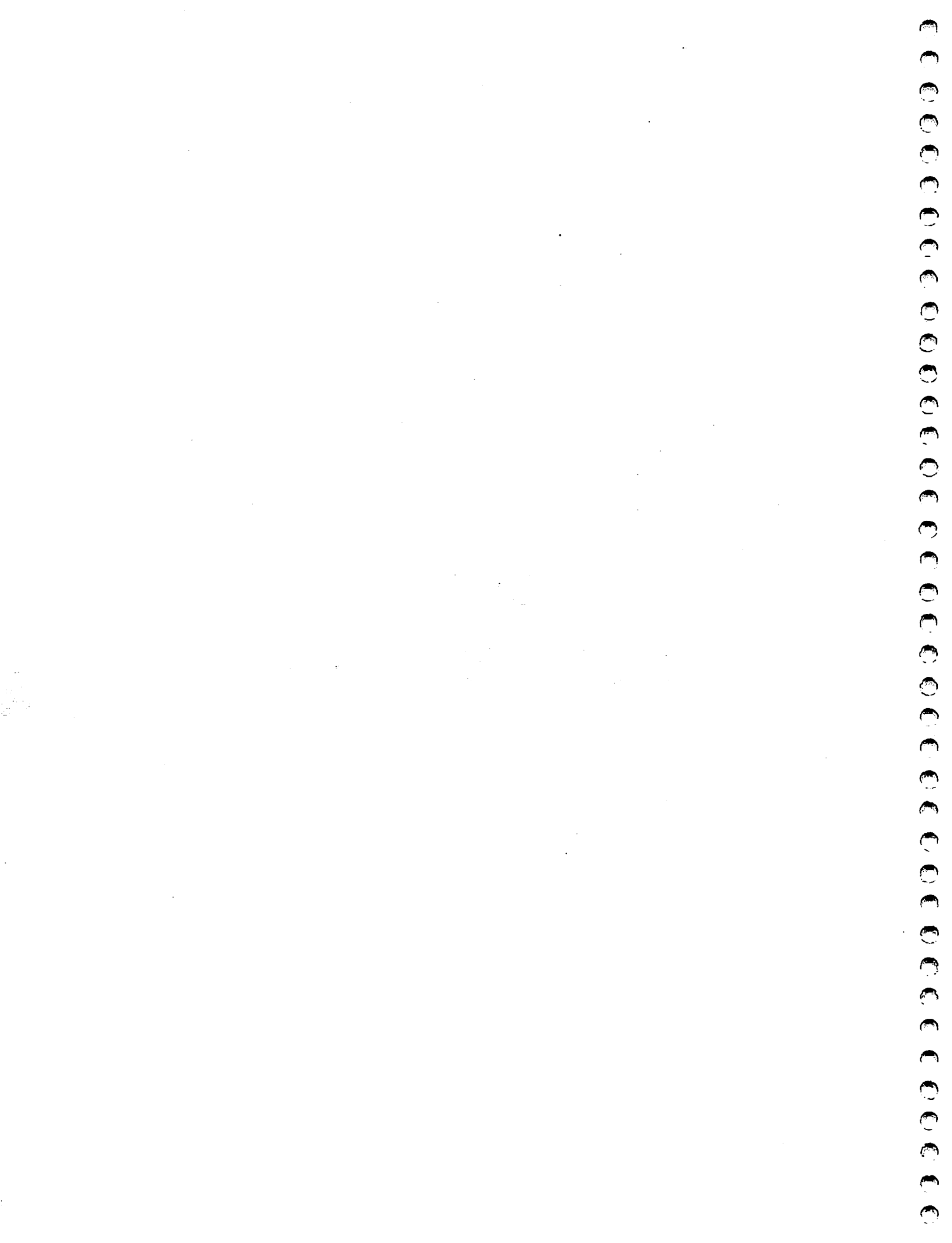
The ESC @ code resets the printer to the power-on status. The top-of-form is set at the current paper position and all data in the buffer preceding this code is printed. Characters which have been downloaded and selection of the download area (expanded CG) are not affected by this code. Therefore, succeeding data shouldn't be sent until the initialization is finished. The current print quality will not be changed.

#### Format

ESC @                      LPRINT CHR\$(27); "@";

# **CHAPTER 5**

## **MAINTENANCE**



---

## 5.1 Periodic Maintenance

---

- **General Operating Notes**

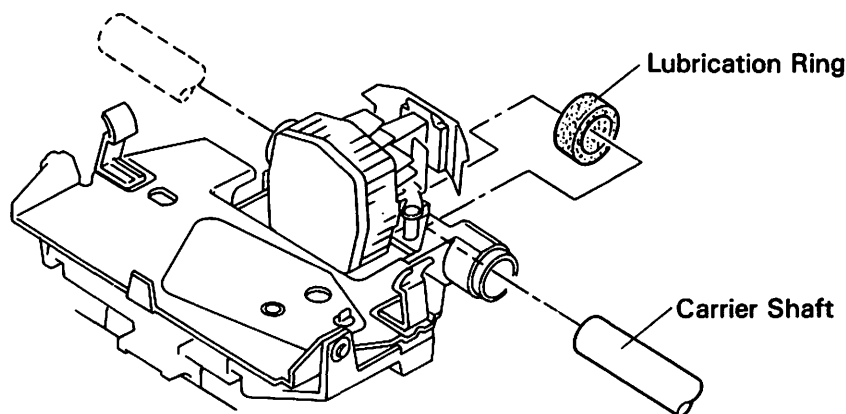
- (1) DO NOT print without a ribbon. This can damage the head pins.
- (2) Use only the recommended ribbon. The use of other ribbons can damage the head.
- (3) The ribbon should be replaced whenever worn due to excessive use. Ribbon life is approximately 1,500,000 characters.
- (4) Use the recommended paper.
- (5) Remove any foreign material dropped into the printer before applying power.

It is important to perform the following periodic maintenance to ensure proper printer operation.

### 5.1.1 Lubrication

- (a) **Lubrication Method**

Prior to application of any lubrication, remove all accumulated dirt and old lubrication from the carrier shaft and the carrier shaft guide with a lintless cloth. Then apply a small amount of Launa oil to the lubrication ring.



**Fig. 5-1 Lubrication Points**

- (b) **Lubrication Period**

Oil should be applied yearly or every 500,000 lines of printing.

- (c) **Notes on Lubrication**

Use only Launa oil. Lubricate only the lubrication ring as shown above.

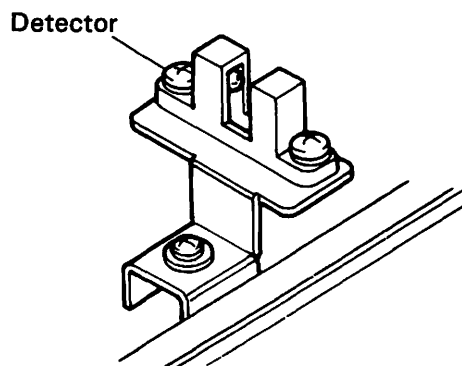


## 5.1.2 Cleaning

### (a) Cleaning Points and Method

#### 1) Detector

Brush off any paper dust on and around the detector. (Refer to Fig. 5-2.)



**Fig. 5-2 Home (left-most carriage) Position Sensor**

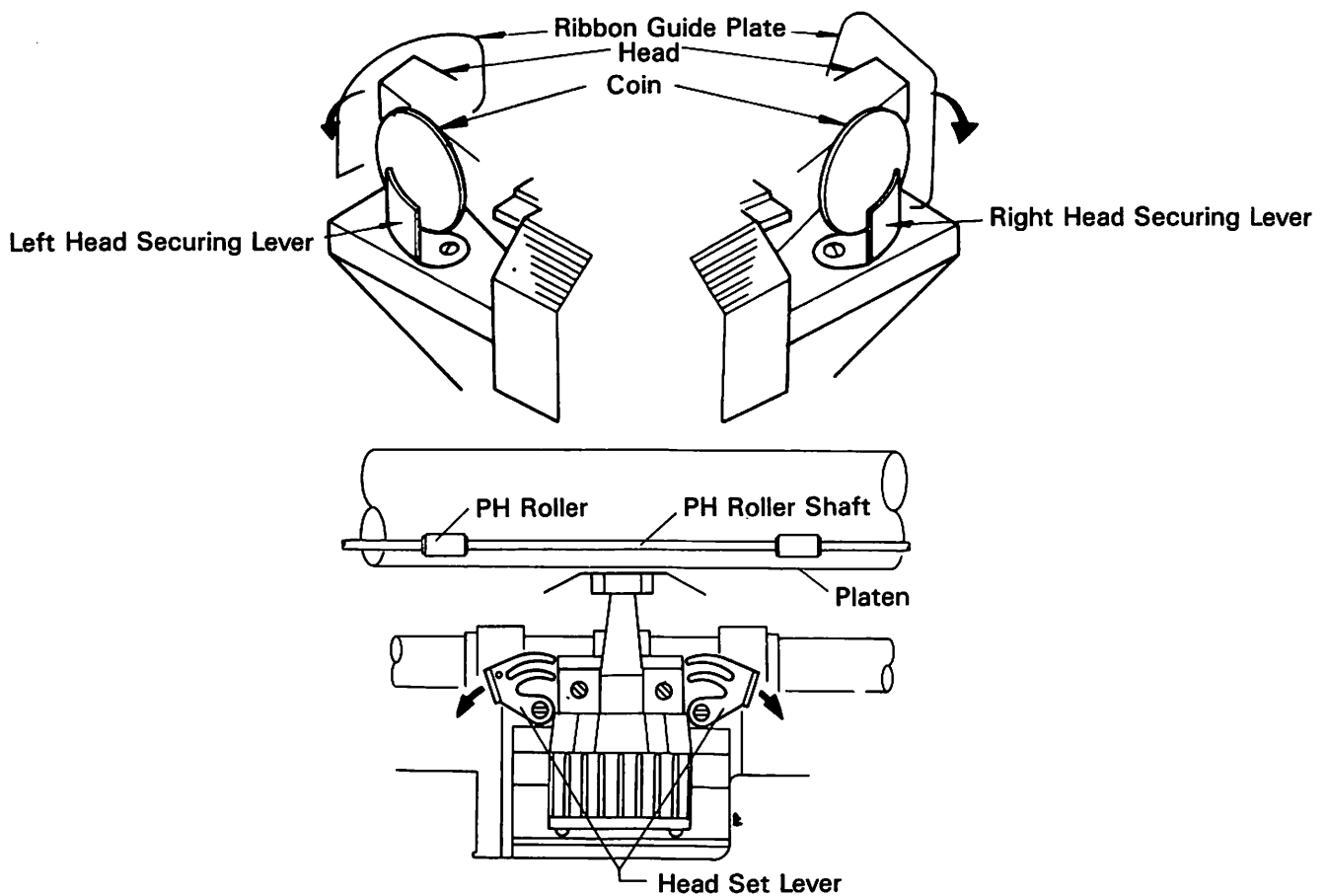
#### 2) The Head Top

Detach the ribbon, and remove the head as described later. Next, remove ribbon blocks and paper particles from the head top with the bush (option).

- **Head removal**

When removing the head, follow the procedure described below:

- 1) Remove the print cover, and move the head to a position where no PH roller is fitted. (See Fig. 5-3 below.)
- 2) Insert a coin between the head and the right and left head securing levers. Turn the right coin clockwise and left coin counterclockwise to open the levers.
- 3) Pull the PH shaft toward the front, and lift the head straight up. The head male connector then parts from the female connector attached to the printer. Next, push the PH shaft toward the rear, and lift the head again to complete removal. Be careful not to bend the ribbon guide plate while removing or replacing the head.



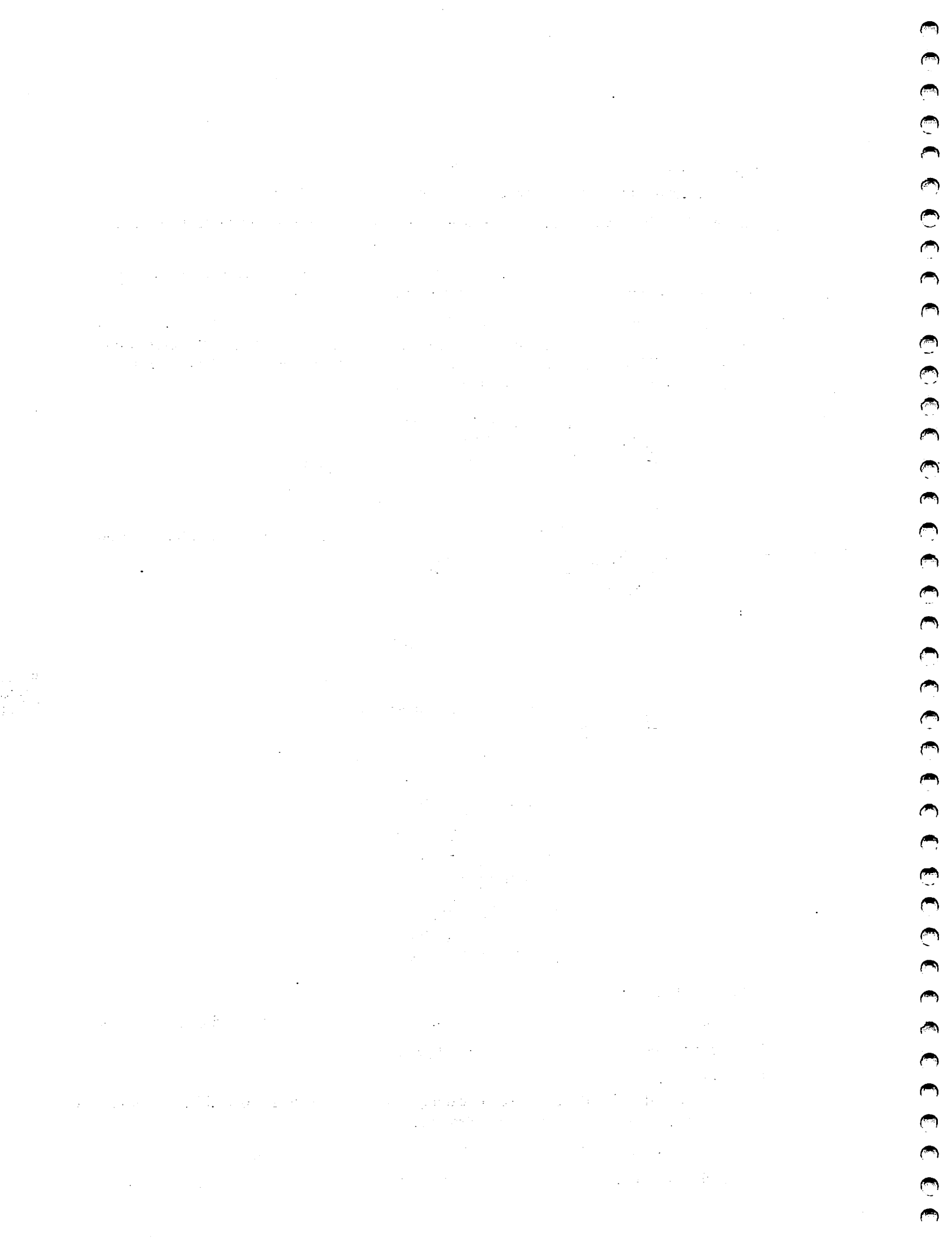
**Fig. 5-3 Head Removal**

**(b) Cleaning Period**

- 1) Whenever ribbon chips or dust accumulate on the detector or the end of the print head.
- 2) Every 500,000 lines of printing or every year.

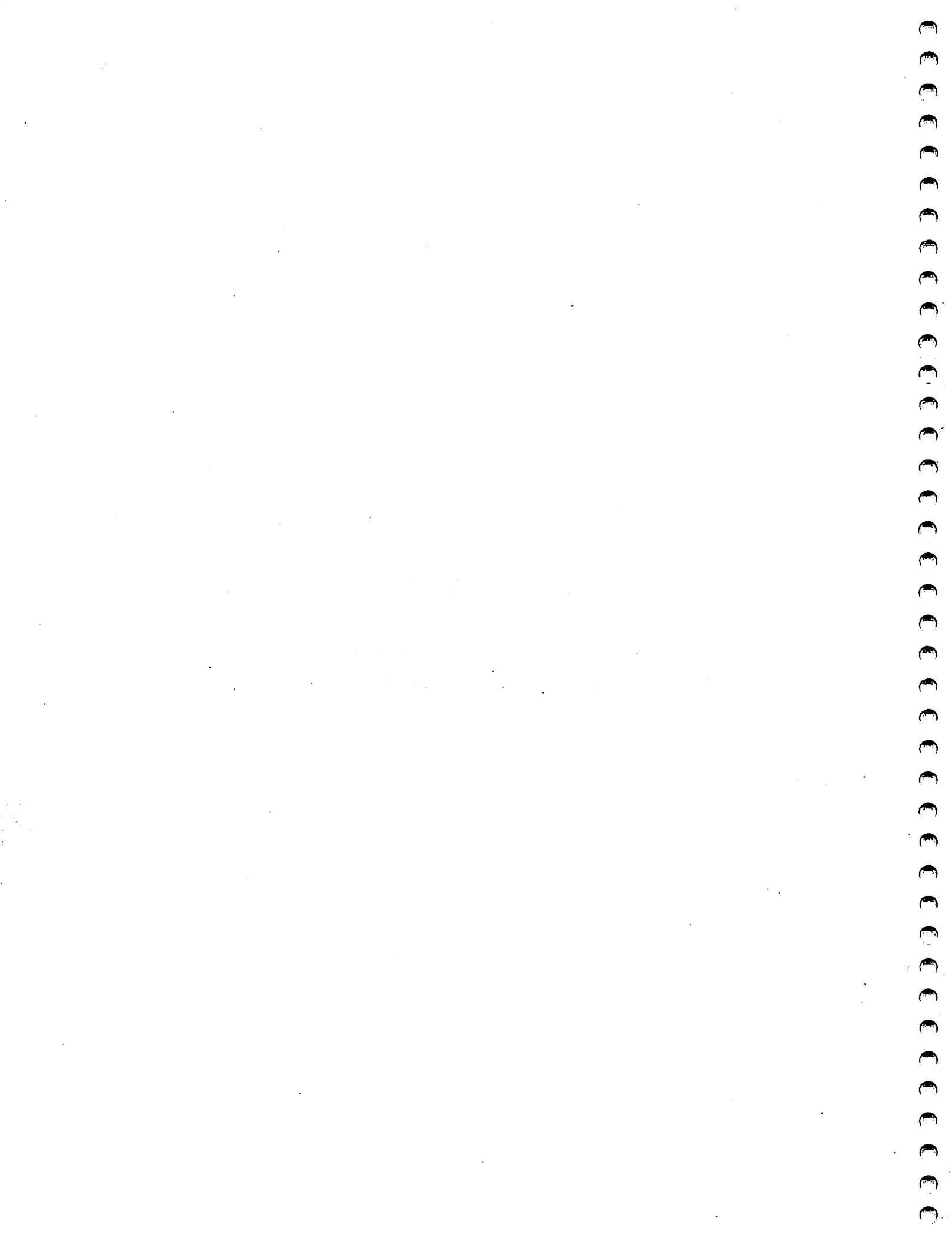
**(c) Notes on Cleaning**

- 1) To avoid disturbing delicate mechanical adjustment made during assembly, do not remove parts other than the ribbon when cleaning.
- 2) Do not use detergents or solvents such as benzine when cleaning.
- 3) To clean the cover, use cloth with water or weak soap solution.



# **CHAPTER 6**

## **CODE DEFINITION**



# 6.1 IBM Mode Character Set

## 6.1.1 Hex. Code Table

The following table shows the ASCII codes (control codes 0 to 31) and the normal characters for codes 32 to 255.

									0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1								
									0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1								
									0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1								
									0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1								
b8	b7	b6	b5	b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F								
									0	0	0	0	0	NUL	DEL	SP	0	@	P	°	p	Ç	É	á	█	Ł	ll	α	≡			
									0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	ü	æ	í	█	⊥	⌣	β	±			
									0	0	1	0	2	STX	DC2	"	2	B	R	b	r	é	Æ	ó	█	⌣	⌠	Γ	≥			
									0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	â	ô	ú		⌣	ll	Π	≤			
									0	1	0	0	4	ËOT	DC4	\$	4	D	T	d	t	ä	ö	ñ	⌣	-	Ł	Σ	∫			
									0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	à	ò	Ñ	⌣	+	F	σ	∫			
									0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	å	û	ª	⌣	⌣	π	μ	÷			
									0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	ç	ù	º	⌣	⌣	⌣	τ	≈			
									1	0	0	0	8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	⌣	⌣	⌣	⌣	Φ	°		
									1	0	0	1	9	HT	EM	)	9	I	Y	i	y	ë	Ö	⌣	⌣	⌣	⌣	⌣	θ	■		
									1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	è	Ü	⌣	⌣	⌣	⌣	⌣	Ω	-		
									1	0	1	1	B	VT	ESC	+	;	K	[	k	{	ï	ç	1/2	⌣	⌣	⌣	⌣	δ	√		
									1	1	0	0	C	FF	FS	,	<	L	,	l		î	£	1/4	⌣	⌣	⌣	⌣	∞	∩		
									1	1	0	1	D	CR	GS	-	=	M	]	m	}	ı	¥	ı	⌣	=	⌣	⌣	∅	2		
									1	1	1	0	E	SO	RS	.	>	N	^	n	~	Ä	Pt	«	⌣	⌣	⌣	⌣	€	■		
									1	1	1	1	F	SI	US	/	?	O	-	o	DEL	Å	f	»	⌣	⌣	⌣	⌣	∩	SP		

## 6.1.2 Dec. Code Table

0	1	2	3	4	5	6	7	8	9
NUL							BEL	BS	HT
10	11	12	13	14	15	16	17	18	19
LF	VT	FF	CR	SO	SI		DC1	DC2	DC3
20	21	22	23	24	25	26	27	28	29
DC4				CAN			ESC		
30	31	32	33	34	35	36	37	38	39
		SP	!	"	#	\$	%	&	'
40	41	42	43	44	45	46	47	48	49
(	)	*	+	,	-	.	/	0	1
50	51	52	53	54	55	56	57	58	59
2	3	4	5	6	7	8	9	:	;
60	61	62	63	64	65	66	67	68	69
<	=	>	?	⊙	A	B	C	D	E
70	71	72	73	74	75	76	77	78	79
F	G	H	I	J	K	L	M	N	O
80	81	82	83	84	85	86	87	88	89
P	Q	R	S	T	U	V	W	X	Y
90	91	92	93	94	95	96	97	98	99
Z	[	\	]	^	_	`	a	b	c
100	101	102	103	104	105	106	107	108	109
d	e	f	g	h	i	j	k	l	m
110	111	112	113	114	115	116	117	118	119
n	o	p	q	r	s	t	u	v	w
120	121	122	123	124	125	126	127	128	129
x	y	z	{		}	~		NUL	

Character Set 1 (Part 1 of 2)

130	131	132	133	134	135	136	137	138	139
					BEL	BS	HT	LF	VT
140	141	142	143	144	145	146	147	148	149
FF	CR	SO	SI		DC1	DC2	DC3	DC4	
150	151	152	153	154	155	156	157	158	159
		CAN			ESC				
160	161	162	163	164	165	166	167	168	169
á	í	ó	ú	ñ	Ñ	ä	ö	¿	¡
170	171	172	173	174	175	176	177	178	179
⌞	½	¼	¡	<<	>>	▒	▒	▒	
180	181	182	183	184	185	186	187	188	189
†	‡	§	¶	⌚	⌚	⌚	⌚	⌚	⌚
190	191	192	193	194	195	196	197	198	199
‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
200	201	202	203	204	205	206	207	208	209
‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
210	211	212	213	214	215	216	217	218	219
π	ℓ	ℓ	ℓ	π	π	π	π	π	π
220	221	222	223	224	225	226	227	228	229
■	■	■	■	α	β	γ	π	Σ	σ
230	231	232	233	234	235	236	237	238	239
μ	τ	ϕ	θ	Ω	δ	∞	∅	€	∩
240	241	242	243	244	245	246	247	248	249
≡	±	≥	≤	∫	J	÷	≈	°	■
250	251	252	253	254	255				
-	√	∩	2	■	SP				

Character Set 1 (Part 2 of 2)

0	1	2	3	4	5	6	7	8	9
NUL			♥	♦	♣	♠	BEL	BS	HT
10	11	12	13	14	15	16	17	18	19
LF	VT	FF	CR	SO	SI		DC1	DC2	DC3
20	21	22	23	24	25	26	27	28	29
DC4	§			CAN			ESC		
30	31	32	33	34	35	36	37	38	39
		SP	!	”	#	\$	%	&	'
40	41	42	43	44	45	46	47	48	49
(	)	*	+	,	—	.	/	0	1
50	51	52	53	54	55	56	57	58	59
2	3	4	5	6	7	8	9	:	;
60	61	62	63	64	65	66	67	68	69
<	=	>	?	⓪	A	B	C	D	E
70	71	72	73	74	75	76	77	78	79
F	G	H	I	J	K	L	M	N	O
80	81	82	83	84	85	86	87	88	89
P	Q	R	S	T	U	V	W	X	Y
90	91	92	93	94	95	96	97	98	99
Z	[	\	]	^	_	`	a	b	c
100	101	102	103	104	105	106	107	108	109
d	e	f	g	h	i	j	k	l	m
110	111	112	113	114	115	116	117	118	119
n	o	p	q	r	s	t	u	v	w
120	121	122	123	124	125	126	127	128	129
x	y	z	{		}	~		ç	ü

Character Set 2 (Part 1 of 2 )

130	131	132	133	134	135	136	137	138	139
é	â	ä	à	å	ç	ê	ë	è	ï
140	141	142	143	144	145	146	147	148	149
î	ì	Ä	Å	É	æ	Æ	ô	ö	ò
150	151	152	153	154	155	156	157	158	159
û	ù	ÿ	Ö	Ü	ç	£	¥	℞	ƒ
160	161	162	163	164	165	166	167	168	169
á	í	ó	ú	ñ	Ñ	ä	ö	¿	¬
170	171	172	173	174	175	176	177	178	179
¬	½	¼	¡	<<	>>	▒	▒	▒	
180	181	182	183	184	185	186	187	188	189
†	‡	§	¶	§	§	§	§	§	§
190	191	192	193	194	195	196	197	198	199
‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
200	201	202	203	204	205	206	207	208	209
‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
210	211	212	213	214	215	216	217	218	219
π	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ
220	221	222	223	224	225	226	227	228	229
■	■	■	■	α	β	γ	π	Σ	σ
230	231	232	233	234	235	236	237	237	239
μ	τ	ϕ	θ	Ω	δ	∞	∅	€	∩
240	241	242	243	244	245	246	247	248	249
≡	±	≥	≤	∫	∫	÷	≈	°	■
250	251	252	253	254	255				
-	√	∩	2	■	SP				

Character Set 2 (Part 2 of 2)



0	1	2	3	4	5	6	7	8	9
NUL			♥	♦	♣	♠	BEL	BS	HT
10	11	12	13	14	15	16	17	18	19
LF	VT	FF	CR	SO	SI			DC2	DC3
20	21	22	23	24	25	26	27	28	29
DC4	§			CAN			ESC		
30	31	32	33	34	35	36	37	38	39
		SP	!	''	#	\$	%	&	'
40	41	42	43	44	45	46	47	48	49
(	)	*	+	,	—	.	/	0	1
50	51	52	53	54	55	56	57	58	59
2	3	4	5	6	7	8	9	:	;
60	61	62	63	64	65	66	67	68	69
<	=	>	?	⊗	A	B	C	D	E
70	71	72	73	74	75	76	77	78	79
F	G	H	I	J	K	L	M	N	O
80	81	82	83	84	85	86	87	88	89
P	Q	R	S	T	U	V	W	X	Y
90	91	92	93	94	95	96	97	98	99
Z	[	\	]	^	_	`	a	b	c
100	101	102	103	104	105	106	107	108	109
d	e	f	g	h	i	j	k	l	m
110	111	112	113	114	115	116	117	118	119
n	o	p	q	r	s	t	u	v	w
120	121	122	123	124	125	126	127	128	129
x	y	z	{		}	~		Ç	ü

Character Set 2'(Part 1 of 2 )

130	131	132	133	134	135	136	137	138	139
é	â	ä	à	å	ç	ê	ë	è	ï
140	141	142	143	144	145	146	147	148	149
î	ì	Ä	Å	É	æ	Æ	ô	ö	ò
150	151	152	153	154	155	156	157	158	159
û	ù	ÿ	Ö	Ü	ø	£	∅	Ł	ł
160	161	162	163	164	165	166	167	168	169
á	í	ó	ú	ñ	Ñ	õ	Õ	ı	ã
170	171	172	173	174	175	176	177	178	179
Ã	Q	ñ	ı	3	α				
180	181	182	183	184	185	186	187	188	189
†	‡	§	¶	§					
190	191	192	193	194	195	196	197	198	199
‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
200	201	202	203	204	205	206	207	208	209
‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
210	211	212	213	214	215	216	217	218	219
π	π	π	π	π	π	π	π	π	π
220	221	222	223	224	225	226	227	228	229
■	■	■	■	α	β	Γ	Π	Σ	σ
230	231	232	233	234	235	236	237	238	239
μ	τ	ϕ	θ	Ω	δ	∞	∅	€	∩
240	241	242	243	244	245	246	247	248	249
≡	±	≥	≤	∫	∫	÷	≈	°	■
250	251	252	253	254	255				
-	√	∩	2	■	SP				

Character Set 2'(Part 2 of 2)

0	1	2	3	4	5	6	7	8	9
			♥	♦	♣	♠			
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
¶	§					→	←		
30	31	32	33	34	35	36	37	38	39
	ø	sp	!	''	#	\$	%	&	'
40	41	42	43	44	45	46	47	48	49
(	)	*	+	,	—	.	/	0	1
50	51	52	53	54	55	56	57	58	59
2	3	4	5	6	7	8	9	:	;
60	61	62	63	64	65	66	67	68	69
<	=	>	?	∅	A	B	C	D	E
70	71	72	73	74	75	76	77	78	79
F	G	H	I	J	K	L	M	N	O
80	81	82	83	84	85	86	87	88	89
P	Q	R	S	T	U	V	W	X	Y
90	91	92	93	94	95	96	97	98	99
Z	[	\	]	^	_	`	a	b	c
100	101	102	103	104	105	106	107	108	109
d	e	f	g	h	i	j	k	l	m
110	111	112	113	114	115	116	117	118	119
n	o	p	q	r	s	t	u	v	w
120	121	122	123	124	125	126	127	128	129
x	y	z	{		}	~		ç	ü

All Characters (Part 1 of 2)

130	131	132	133	134	135	136	137	138	139
é	â	ä	à	å	ç	ê	ë	è	ï
140	141	142	143	144	145	146	147	148	149
î	ì	Ä	Å	É	æ	Æ	ô	ö	ò
150	151	152	153	154	155	156	157	158	159
û	ù	ÿ	Ö	Ü	ç	£	¥	₹	₺
160	161	162	163	164	165	166	167	168	169
á	í	ó	ú	ñ	Ñ	ä	ö	í	ı
170	171	172	173	174	175	176	177	178	179
↵	½	¼	ı	<<	>>	▒	▒	▒	
180	181	182	183	184	185	186	187	188	189
†	‡	§	¶	‡	§	¶	§	¶	‡
190	191	192	193	194	195	196	197	198	199
‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
200	201	202	203	204	205	206	207	208	209
‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
210	211	212	213	214	215	216	217	218	219
π	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ
220	221	222	223	224	225	226	227	228	229
■	■	■	■	α	β	γ	π	Σ	σ
230	231	232	233	234	235	236	237	238	239
μ	τ	ϕ	θ	Ω	δ	∞	∅	€	∩
240	241	242	243	244	245	246	247	248	249
≡	±	≥	≤	∫	∫	÷	≈	°	■
250	251	252	253	254	255				
-	√	∩	2	■	sp				

All Characters (Part 2 of 2)

### 6.1.3 Printing Sample

DP

SET 1

!"#\$%&'()\*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

NLQ

SET 1

!"#\$%&'()\*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

DP

SET 2

!"#\$%&'()\*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

NLQ

SET 2

!"#\$%&'()\*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

DP

SET 2'

!"#\$%&'()\*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

NLQ

SET 2'

!"#\$%&'()\*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

DP

All characters

!"#\$%&'()\*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

NLQ

All characters

!"#\$%&'()\*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

Reduction Percent (80%)

## 6.1.4 Proportional Character Width Tables

### (1) Standard Characters

ASCII CODE		Character	Width	
DEC	HEX		DP	NLQ
32	20	Space	8	16
33	21	!	6	12
34	22	"	8	16
35	23	#	12	24
36	24	\$	12	24
37	25	%	12	24
38	26	&	12	24
39	27	'	6	12
40	28	(	8	16
41	29	)	8	16
42	2A	*	10	20
43	2B	+	12	24
44	2C	,	6	12
45	2D	—	12	24
46	2E	.	6	12
47	2F	/	10	20
48	30	0	12	24
49	31	1	8	16
50	32	2	12	24
51	33	3	12	24
52	34	4	12	24
53	35	5	12	24
54	36	6	12	24
55	37	7	12	24
56	38	8	12	24
57	39	9	12	24
58	3A	:	6	12
59	3B	;	6	12
60	3C	<	8	16
61	3D	=	12	24
62	3E	>	8	16
63	3F	?	12	24
64	40	@	12	24
65	41	A	12	24
66	42	B	12	24

ASCII CODE		Character	Width	
DEC	HEX		DP	NLQ
67	43	C	12	24
68	44	D	12	24
69	45	E	12	24
70	46	F	12	24
71	47	G	12	24
72	48	H	12	24
73	49	I	8	16
74	4A	J	10	20
75	4B	K	12	24
76	4C	L	12	24
77	4D	M	12	24
78	4E	N	12	24
79	4F	O	12	24
80	50	P	12	24
81	51	Q	12	24
82	52	R	12	24
83	53	S	12	24
84	54	T	12	24
85	55	U	12	24
86	56	V	12	24
87	57	W	12	24
88	58	X	12	24
89	59	Y	12	24
90	5A	Z	12	24
91	5B	[	8	16
92	5C	\	10	20
93	5D	]	8	16
94	5E	^	8	16
95	5F	—	12	24
96	60	`	6	12
97	61	a	12	24
98	62	b	10	20
99	63	c	10	20
100	64	d	10	20
101	65	e	12	24

ASCII CODE		Character	Width	
DEC	HEX		DP	NLO
102	66	f	10	20
103	67	g	10	20
104	68	h	10	20
105	69	i	8	16
106	6A	j	8	16
107	6B	k	10	20
108	6C	l	8	16
109	6D	m	12	24
110	6E	n	10	20
111	6F	o	12	24
112	70	p	10	20
113	71	q	10	20
114	72	r	10	20
115	73	s	12	24
116	74	t	8	16
117	75	u	12	24
118	76	v	12	24
119	77	w	12	24
120	78	x	12	24
121	79	y	12	24
122	7A	z	10	20
123	7B	{	8	16
124	7C		6	12
125	7D	}	8	16
126	7E	~	10	20
127	7F			

## (2) International Characters

ASCII CODE		Character	Width	
DEC	HEX		DP	NLQ
20	14	¶	19	20
21	15	§	10	20
128	80	Ç	12	24
129	81	ü	12	24
130	82	é	12	24
131	83	â	14	42
132	84	ä	12	24
133	85	à	12	24
134	86	ã	12	24
135	87	ç	12	24
136	88	ê	14	28
137	89	ë	12	24
138	8A	è	12	24
139	8B	ï	8	16
140	8C	î	10	20
141	8D	ı	8	16
142	8E	Ä	12	24
143	8F	Å	12	24
144	90	É	12	24
145	91	æ	12	24
146	92	Æ	12	24
147	93	ô	12	24
148	94	ö	12	24
149	95	ò	12	24
150	96	û	12	24
151	97	ù	12	24
152	98	ÿ	12	24
153	99	ö	12	24
154	9A	Ü	12	24
155	9B	¢	10	20

ASCII CODE		Character	Width	
DEC	HEX		DP	NLQ
156	9C	£	10	20
157	9D	¥	12	24
158	9E	Pt	12	24
159	9F	f	12	24
160	A0	á	12	24
161	A1	í	8	16
162	A2	ó	12	24
163	A3	ú	12	24
164	A4	ñ	10	20
165	A5	Ñ	12	24
166	A6	ª	12	24
167	A7	º	12	24
168	A8	¿	12	24
173	AD	ı	6	12

### Special Characters of Character Set 2'

ASCII CODE		Character	Width	
DEC	HEX		DP	NLQ
155	9B	ø	10	20
157	9D	Ø	12	24
158	9E	L	12	24
159	9F	I	10	20
166	A6	ö	12	24
167	A7	Ö	12	24
169	A9	ä	12	24
170	AA	Ä	12	24
171	AB	ℓ	10	20
172	AC	n	12	24
174	AE	3	10	20
175	AF	⌘	12	24

## 6.2 EPSON Mode Character Set

### 6.2.1 Hex. Code Table

The USA character set is adopted as the international character set. Refer to 6.2.3 for other international character sets.

								0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1			
								0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1			
								0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1	1			
								0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1			
b8	b7	b6	b5	b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F				
								0	0	0	0	0	NUL	DEL	SP	0	@	P	`	p	NUL	DEL	SP	0	@	P	`	p
								0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	SOH	DC1	!	1	A	Q	a	q
								0	0	1	0	2	STX	DC2	"	2	B	R	b	r	STX	DC2	"	2	B	R	b	r
								0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	ETX	DC3	#	3	C	S	c	s
								0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	EOT	DC4	\$	4	D	T	d	t
								0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	ENQ	NAK	%	5	E	U	e	u
								0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	ACK	SYN	&	6	F	V	f	v
								0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	BEL	ETB	'	7	G	W	g	w
								1	0	0	0	8	BS	CAN	(	8	H	X	h	x	BS	CAN	(	8	H	X	h	x
								1	0	0	1	9	HT	EM	)	9	I	Y	i	y	HT	EM	)	9	I	Y	i	y
								1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	LF	SUB	*	:	J	Z	j	z
								1	0	1	1	B	VT	ESC	+	;	K	[	k	{	VT	ESC	+	;	K	[	k	{
								1	1	0	0	C	FF	FS	,	<	L	\	l	!	FF	FS	,	<	L	\	l	!
								1	1	0	1	D	CR	GS	-	=	M	]	m	}	CR	GS	-	=	M	]	m	}
								1	1	1	0	E	SO	RS	.	>	N	^	n	~	SO	RS	.	>	N	^	n	~
								1	1	1	1	F	SI	US	/	?	O	-	o	DEL	SI	US	/	?	O	-	o	

## 6.2.2 Dec. Code Table

0	1	2	3	4	5	6	7	8	9
NUL							BEL	BS	HT
10	11	12	13	14	15	16	17	18	19
LF	VT	FF	CR	SO	SI		DC1	DC2	DC3
20	21	22	23	24	25	26	27	28	29
DC4				CAN			ESC		
30	31	32	33	34	35	36	37	38	39
		SP	!	"	#	\$	%	&	'
40	41	42	43	44	45	46	47	48	49
(	)	*	+	,	-	.	/	0	1
50	51	52	53	54	55	56	57	58	59
2	3	4	5	6	7	8	9	:	;
60	61	62	63	64	65	66	67	68	69
<	=	>	?	⓪	A	B	C	D	E
70	71	72	73	74	75	76	77	78	79
F	G	H	I	J	K	L	M	N	O
80	81	82	83	84	85	86	87	88	89
P	Q	R	S	T	U	V	W	X	Y
90	91	92	93	94	95	96	97	98	99
Z	[	\	]	^	_	`	a	b	c
100	101	102	103	104	105	106	107	108	109
d	e	f	g	h	i	j	k	l	m
110	111	112	113	114	115	116	117	118	119
n	o	p	q	r	s	t	u	v	w
120	121	122	123	124	125	126	127	128	129
x	y	z	{		}	~	DEL	NUL	

International Set (U.S.A.)

130	131	132	133	134	135	136	137	138	139
					BEL	BS	HT	LF	VT
140	141	142	143	144	145	146	147	148	149
FF	CR	SO	SI			DC2		DC4	
150	151	152	153	154	155	156	157	158	159
		CAN			ESC				
160	161	162	163	164	165	166	167	168	169
SP	!	"	#	\$	%	&	'	(	)
170	171	172	173	174	175	176	177	178	179
*	+	,	-	.	/	0	1	2	3
180	181	182	183	184	185	186	187	188	189
4	5	6	7	8	9	:	;	<	=
190	191	192	193	194	195	196	197	198	199
>	?	@	A	B	C	D	E	F	G
200	201	202	203	204	205	206	207	208	209
H	I	J	K	L	M	N	O	P	Q
210	211	212	213	214	215	216	217	218	219
R	S	T	U	V	W	X	Y	Z	[
220	221	222	223	224	225	226	227	228	229
\	]	^	_	`	a	b	c	d	e
230	231	232	233	234	235	236	237	238	239
f	g	h	i	j	k	l	m	n	o
240	241	242	243	244	245	246	247	248	249
p	q	r	s	t	u	v	w	x	y
250	251	252	253	254	255				
z	{		}	~					

International Set (U.S.A.)



### 6.2.3 Substitution List for International Character Set

NO		HEX											
		1	2	3	4	5	6	7	8	9	10	11	12
		23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	USA (American)	#	\$	@	[	\	]	^	`	{		}	~
1	FR (French)			à	°	ç	¸			é	ù	è	..
2	GE (German)			¸	Ä	Ö	Ü			ä	ö	ü	ß
3	UK (British)	£											
4	DN (Danish)				Æ	Φ	Å			æ	ø	å	
5	SW (Swedish)		☉	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	IT (Italian)				°		é		ù	à	ò	è	ì
7	SP (Spanish)	Pt			í	Ñ	¿			ñ			
8	JA (Japanese)				¥								
9	NOR (Norwegian)		☉	É	Æ	Φ	Å	Ü	é	æ	ø	å	ü
10	DN2 (Danish 2)			É	Æ	Φ	Å	Ü	é	æ	ø	å	ü
11	AF (Afrikaans)		ê	Ê	Ë	Ö	è	Ü	é	ë	ö	ô	ü
12	DU (Dutch)					IJ					ij		
13	FRC (French Canadian)			à	â	ç	ê	î	ô	é	ú	è	û
14	FR2 (French 2)		â	à	î	ç	ê	û	ô	é	ú	è	ï
15	UK2 (British 2)		£										

## 6.2.4 Proportional Character Width Tables

### (1) Standard Characters

This table corresponds to IBM standard characters

ASCII CODE		Character	Width	
DEC	HEX		DP	NLQ
32	20	Space	8	16
33	21	!	6	12
34	22	"	8	16
35	23	# *	12	24
36	24	\$ *	12	24
37	25	%	12	24
38	26	&	12	24
39	27	'	6	12
40	28	(	8	16
41	29	)	8	16
42	2A	*	10	20
43	2B	+	12	24
44	2C	,	6	12
45	2D	—	12	24
46	2E	.	6	12
47	2F	/	10	20
48	30	0	12	24
49	31	1	8	16
50	32	2	12	24
51	33	3	12	24
52	34	4	12	24
53	35	5	12	24
54	36	6	12	24
55	37	7	12	24
56	38	8	12	24
57	39	9	12	24
58	3A	:	6	12
59	3B	;	6	12
60	3C	<	8	16
61	3D	=	12	24
62	3E	>	8	16
63	3F	?	12	24
64	40	@ *	12	24
65	41	A	12	24
66	42	B	12	24
67	43	C	12	24
68	44	D	12	24

ASCII CODE		Character	Width	
DEC	HEX		DP	NLQ
69	45	E	12	24
70	46	F	12	24
71	47	G	12	24
72	48	H	12	24
73	49	I	8	16
74	4A	J	10	20
75	4B	K	12	24
76	4C	L	12	24
77	4D	M	12	24
78	4E	N	12	24
79	4F	O	12	24
80	50	P	12	24
81	51	Q	12	24
82	52	R	12	24
83	53	S	12	24
84	54	T	12	24
85	55	U	12	24
86	56	V	12	24
87	57	W	12	24
88	58	X	12	24
89	59	Y	12	24
90	5A	Z	12	24
91	5B	[ *	8	16
92	5C	\ *	10	20
93	5D	] *	8	16
94	5E	^ *	8	16
95	5F	_	12	24
96	60	` *	6	12
97	61	a	12	24
98	62	b	10	20
99	63	c	10	20
100	64	d	10	20
101	65	e	12	24
102	66	f	10	20
103	67	g	10	20
104	68	h	10	20
105	69	i	8	16

NOTE: \* Characters vary with each country

ASCII CODE		Character	Width	
DEC	HEX		DP	NLQ
106	6A	j	8	16
107	6B	k	10	20
108	6C	l	8	16
109	6D	m	12	24
110	6E	n	10	20
111	6F	o	12	24
112	70	p	10	20
113	71	q	10	20
114	72	r	10	20
115	73	s	12	24
116	74	t	8	16
117	75	u	12	24
118	76	v	12	24
119	77	w	12	24
120	78	x	12	24
121	79	y	12	24
122	7A	z	10	20
123	7B	{*	8	16
124	7C	*	6	12
125	7D	}*	8	16
126	7E	~*	10	20
127	7F			

## (2) International Characters

ASCII CODE		USA (American)			FR (French)			GE (German)		
DEC	HEX	Character	Width		Character	Width		Character	Width	
			DP	NLQ		DP	NLQ		DP	NLQ
35	23	#	12	24						
36	24	\$	12	24						
64	40	@	12	24	à	12	24	§	10	20
91	5B	[	8	16	°	6	12	Ä	12	24
92	5C	\	10	20	ç	12	24	Ö	12	24
93	5D	]	8	16	§	10	20	Ü	12	24
94	5E	^	8	16						
96	60	`	6	12						
123	7B	{	8	16	é	12	24	ä	12	24
124	7C		6	12	ù	12	24	ö	12	24
125	7D	}	8	16	è	12	24	ü	12	24
126	7E	~	10	20	”	10	20	ß	10	20

ASCII CODE		UK (British)			DN (Danish)			SW (Swedish)		
DEC	HEX	Character	Width		Character	Width		Character	Width	
			DP	NLQ		DP	NLQ		DP	NLQ
35	23	£	10	20						
36	24								12	24
64	40							É	12	24
91	5B				Æ	12	24	Ä	12	24
92	5C				Φ	12	24	Ö	12	24
93	5D				Å	12	24	Å	12	24
94	5E							Ü	12	24
96	60							é	12	24
123	7B				æ	12	24	ä	12	24
124	7C				ø	10	20	ö	12	24
125	7D				å	12	24	å	12	24
126	7E							ü	12	24

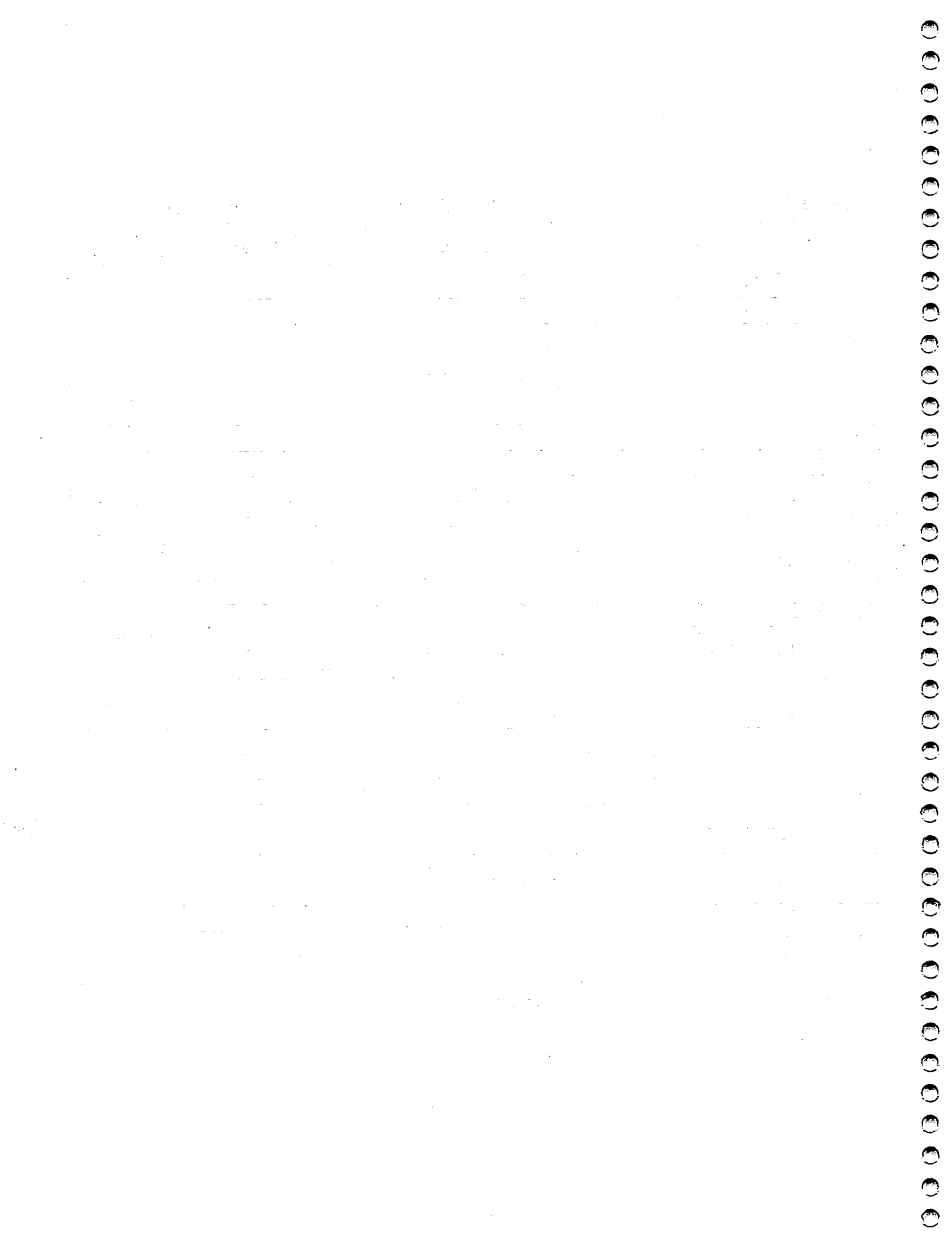
ASCII CODE		IT (Italian)			SP (Spanish)			JA (Japanese)		
DEC	HEX	Character	Width		Character	Width		Character	Width	
			DP	NLQ		DP	NLQ		DP	NLQ
35	23				Pt	12	24			
36	24									
64	40									
91	5B	°	6	12	!	6	12			
92	5C				Ñ	12	24	¥	12	24
93	5D	é	12	24	¿	12	24			
94	5E									
96	60	ù	12	24						
123	7B	à	12	24	¨	10	20			
124	7C	ò	12	24	ñ	10	20			
125	7D	è	12	24						
126	7E	ì	8	16						

ASCII CODE		NOR (Norwegian)			DN (Danish 2)			AF (Afrikaans)		
DEC	HEX	Character	Width		Character	Width		Character	Width	
			DP	NLQ		DP	NLQ		DP	NLQ
35	23									
36	24		12	24				ê	14	28
64	40	É	12	24	É	12	24	Ê	12	24
91	5B	Æ	12	24	Æ	12	24	Ê	12	24
92	5C	Φ	12	24	Φ	12	24	Ö	12	24
93	5D	Å	12	24	Å	12	24	è	12	24
94	5E	Ü	12	24	Ü	12	24	Ü	12	24
96	60	é	12	24	é	12	24	é	12	24
123	7B	æ	12	24	æ	12	24	ë	12	24
124	7C	ø	10	20	ø	10	20	ö	12	24
125	7D	å	12	24	å	12	24	ô	12	24
126	7E	ü	12	24	ü	12	24	ü	12	24

ASCII CODE		DU (Dutch)			FRC (French canadian)			FR2 (French 2)		
DEC	HEX	Character	Width		Character	Width		Character	Width	
			DP	NLQ		DP	NLQ		DP	NLQ
35	23									
36	24							â	14	28
64	40				à	12	24	à	12	24
91	5B				â	14	28	î	10	20
92	5C	IJ	12	24	ç	12	24	ç	12	24
93	5D				ê	14	28	ê	14	28
94	5E				ï	10	20	û	12	24
96	60				ô	12	24	ô	12	24
123	7B				é	12	24	é	12	24
124	7C	ij	12	24	ú	12	24	ú	12	24
125	7D				è	12	24	è	12	24
126	7E				û	12	24	ï	8	16

ASCII CODE		UK 2 (British 2)								
DEC	HEX	Character	Width		Character	Width		Character	Width	
			DP	NLQ		DP	NLQ		DP	NLQ
35	23									
36	24	£	10	20						
64	40									
91	5B									
92	5C									
93	5D									
94	5E									
96	60									
123	7B									
124	7C									
125	7D									
126	7E									

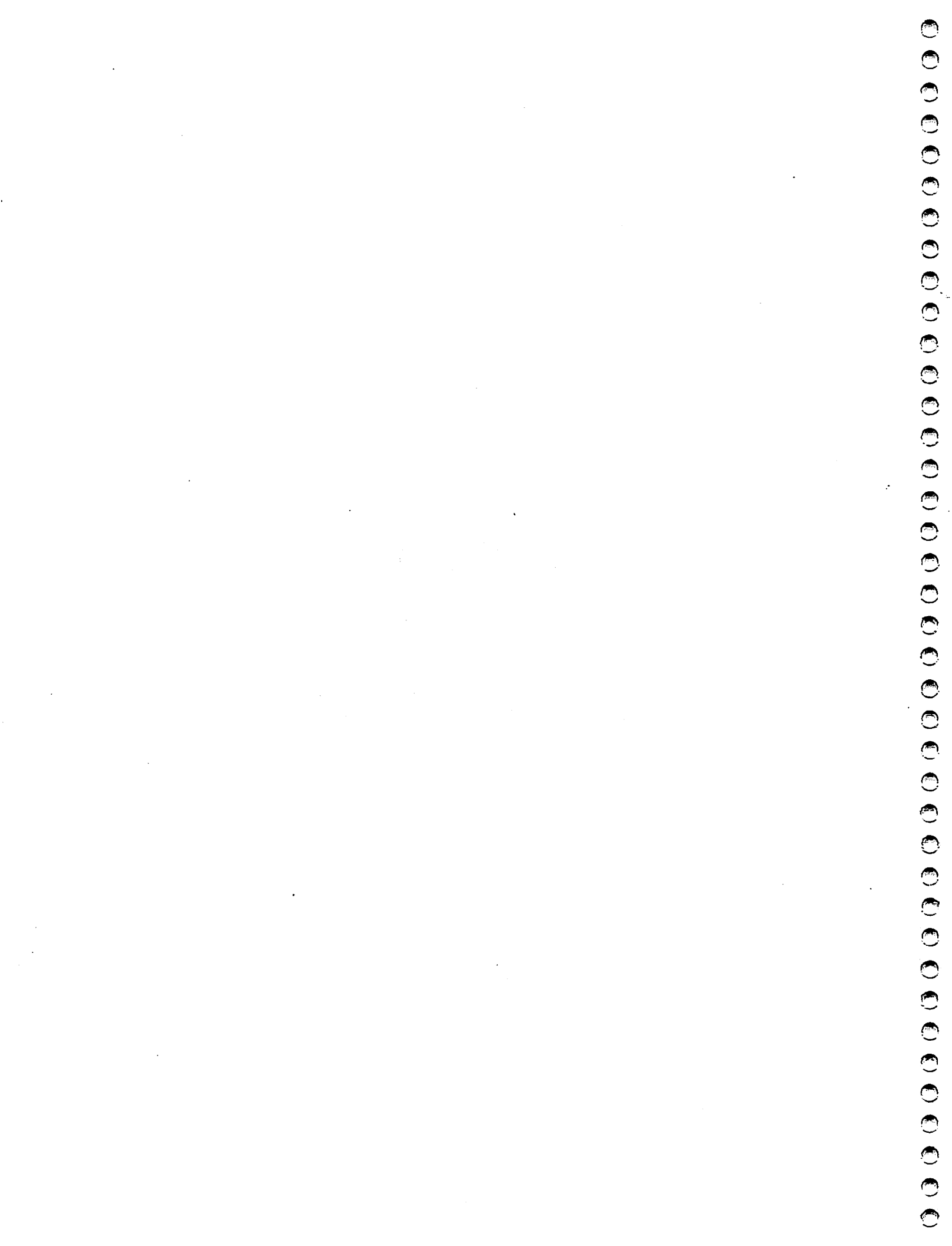
The characters for the blank boxes are the same as the corresponding US characters.



# **CHAPTER 7**

## **QUICK REFERENCE**





## 7.1 IBM Mode

Code Name	Hex. Code	Dec. Code	Function	Ref. Page
BS	08	8	Backspace	4-5
HT	09	9	Horizontal Tabulation	4-6
LF	0A	10	Line Feed	4-7
VT	0B	11	Vertical Tabulation	4-8
FF	0C	12	Form Feed	4-9
CR	0D	13	Carriage Return	4-11
SO	0E	14	Select Double Width Characters	4-12
SI	0F	15	Select Condensed Characters	4-13
DC1	11	17	Select Printer	4-14
DC2	12	18	Clear Condensed Characters	4-13
DC4	14	20	Clear Double Width Characters	4-12
CAN	18	24	Cancel	4-15
ESC	1B	27	Escape	4-16

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Print Direction	ESC U NUL	1B 55 00	27 85 0	Bidirectional	4-19
	ESC U SOH	1B 55 01	27 85 1	Unidirectional	4-19
Print Quality	ESC I NUL	1B 49 00	27 73 0	DP Mode	4-20
	ESC I STX <sup>*1</sup>	1B 49 02	27 73 2	NLQ Mode	4-20
Character Pitch	ESC :	1B 3A	27 58	12 CPI (Elite)	4-21
	ESC SI	1B 0F	27 15	17.1 CPI (Condensed)	4-21
Line Feed	ESC J	1B 4A	27 74	Select n/216 line feed	4-22
	ESC 5 SOH	1B 35 01	27 53 1	Select automatic line feed	4-23
	ESC 5 NUL	1B 35 00	27 53 0	Clear automatic line feed	4-23
	ESC I	1B 5D	27 93	Select reverse line feed	4-24
	ESC 2 <sup>*2</sup>	1B 32	27 50	Set 1/6" line feed	4-25
	ESC 0	1B 30	27 48	Set 1/8" line feed	4-25
	ESC 1	1B 31	27 49	Set 7/72" line feed	4-25
	ESC A	1B 41	27 65	Store n/72" line feed	4-26
	ESC 3	1B 33	27 51	Set n/216 line feed	4-27

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Page Length Set	ESC C	1B 43	27 67	Set page length (line)	4-28
	ESC C NUL	1B 43 00	27 67 0	Set page length (inch)	4-29
	ESC 4	1B 34	27 52	Set TOF	4-37
Skip Perforation	ESC N	1B 4E	27 78	Skip (n) lines	4-31
	ESC O	1B 4F	27 79	Clear skip perforation	4-31
Vertical Tab	ESC B	1B 42	27 66	Set vertical tab	4-33
Horizontal Tab	ESC D	1B 44	27 68	Set horizontal tab	4-35
Initialize	ESC R	1B 52	27 82	Initialize Tabs	4-36
Bit Image Graphic Mode	ESC K	1B 4B	27 75	60 DPI	4-38
	ESC L	1B 4C	27 76	120 DPI	4-40
	ESC Y	1B 59	27 89	120 DPI (Half)	4-40
	ESC Z	1B 5A	27 90	240 DPI (Half)	4-40
Download	ESC I EOT	1B 49 04	27 73 4	DP download Character Select	4-41
	ESC I ACK	1B 49 06	27 73 6	NLQ download Character Select	4-41
	ESC =	1B 3D	27 61	Define download characters	4-42
Character Set	ESC 7	1B 37	27 55	Character Set 1	4-48
	ESC 6	1B 36	27 54	Character Set 2	4-48
All Characters Print Mode	ESC \	1B 5C	27 92	Select All Characters Print Mode 1	4-49
	ESC ^	1B 5E	27 94	Select All Characters Print Mode 2	4-50
Home Head	ESC <	1B 3C	27 60	Home Head	4-51

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Empha-sized Print	ESC E	1B 45	27 69	Set emphasized print	4-53
	ESC F	1B 46	27 70	Clear emphasized print	4-53
Double Strike Print	ESC G	1B 47	27 71	Set double strike print	4-54
	ESC H	1B 48	27 72	Clear double strike print	4-54
Underline	ESC – SOH	1B 2D 01	27 45 1	Start underline	4-55
	ESC – NUL	1B 2D 00	27 45 0	Stop underline	4-55
Super/ Subscript Character	ESC S NUL	1B 53 00	27 83 0	Superscript character command	4-56
	ESC S SOH	1B 53 01	27 83 1	Subscript character command	4-56
	ESC T	1B 54	27 84	Clear super/subscript characters	4-56
Double Width Print	ESC W SOH	1B 57 01	27 87 1	Select double width characters	4-57
	ESC W NUL	1B 57 00	27 87 0	Clear double width characters	4-57
Overscore	ESC __SOH	1B 5F 01	27 95 1	Start overscore	4-58
	ESC __NUL	1B 5F 00	27 95 0	Stop overscore	4-58
Proportioal Spacing	ESC P SOH	1B 50 01	27 80 1	Set proportional spacing	4-59
	ESC P NUL	1B 50 00	27 80 0	Clear proportional spacing	4-59
Dot Spacing	ESC (SP)	1B 20	27 32	Set dot spacing	4-60

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
PE De-tection	ESC 8	1B 38	27 56	PE ineffective	4-62
	ESC 9	1B 39	27 57	PE effective	4-62
Deselect	ESC Q ETX	1B 51 03	27 81 3	Deselect Printer	4-63

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## 7.2 EPSON Mode

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Code Name	Hex. Code	Dec. Code	Function	Ref. Page
BS	08	8	Backspace	4-71
HT	09	9	Horizontal Tabulation	4-72
LF	0A	10	Line Feed	4-73
VT	0B	11	Vertical Tabulation	4-74
FF	0C	12	Form Feed	4-76
CR	0D	13	Carriage Return	4-77
SO	0E	14	Select Double Width Characters	4-78
SI	0F	15	Select Condensed Characters	4-79
DC1	11	17	Select Printer	4-80
DC2	12	18	Clear Condensed Characters	4-79
DC3	13	19	Deselect Printer	4-80
DC4	14	20	Clear Double Width Characters	4-78
CAN	18	24	Cancel	4-81
ESC	1B	27	Escape	4-82
DEL	7F	127	Delete Character	4-83

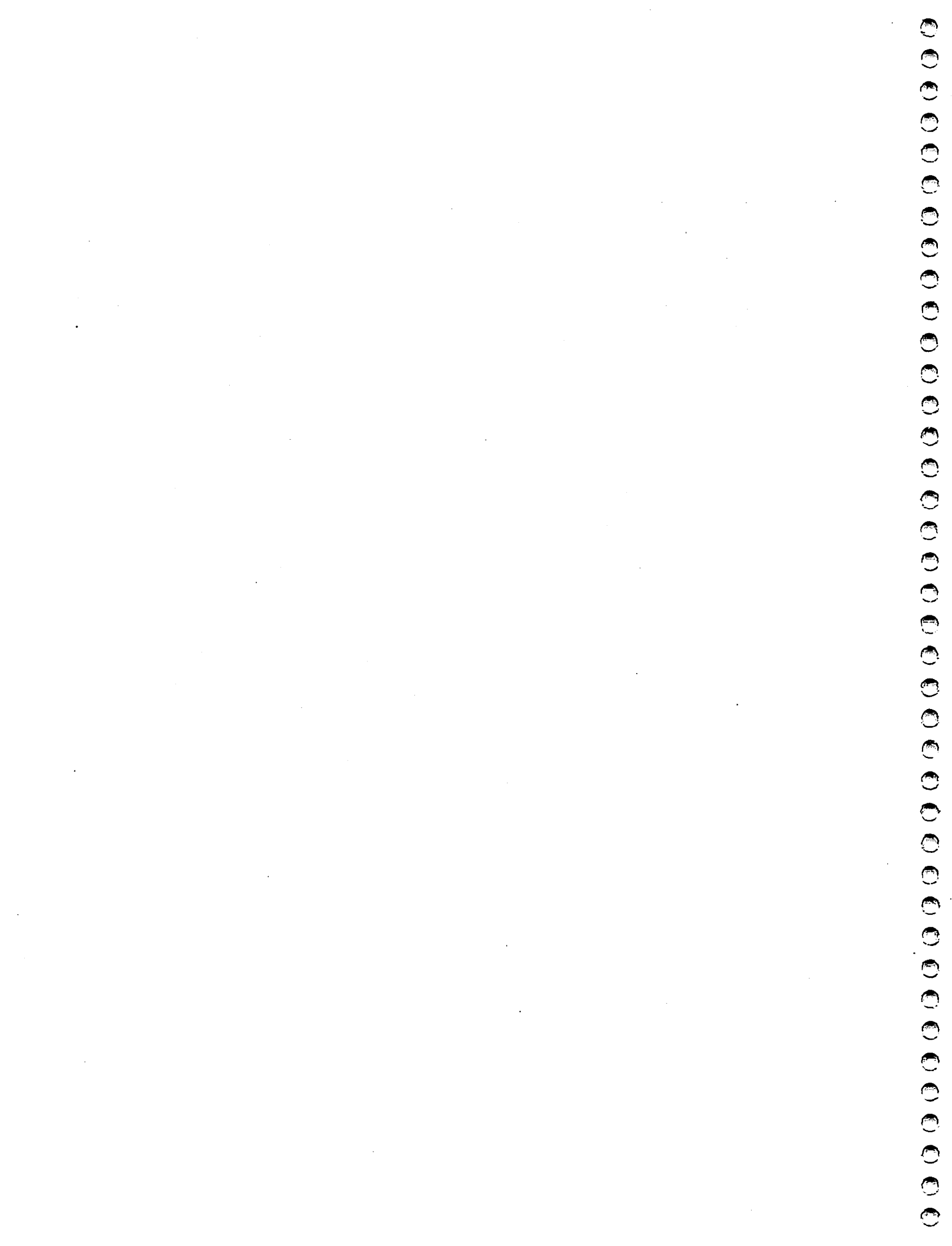
	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Print Direction	ESC U NUL	1B 55 00	27 85 0	Bidirectional	4-86
	ESC U SOH	1B 55 01	27 85 1	Unidirectional	4-86
Print Quality	ESC x NUL	1B 78 00	27 120 0	DP	4-87
	ESC x SOH	1B 78 01	27 120 1	NLQ (*1)	4-87
Character Pitch	ESC P	1B 50	27 80	10 CPI (Pica)	4-88
	ESC M	1B 4D	27 77	12 CPI (Elite)	4-88
Self-cancelling LF Pitch	ESC J	1B 4A	27 74	n/216" line feed	4-89
	ESC j	1B 6A	27 106	n/216" reverse line feed	4-90
Line Feed	ESC 2	1B 32	27 50	1/6" line feed	4-91
	ESC 0	1B 30	27 48	1/8" line feed	4-91
	ESC 1	1B 31	27 49	7/72" line feed	4-91
	ESC A	1B 41	27 65	(n)/72" line feed	4-92
	ESC 3	1B 33	27 51	(n)/216" line feed	4-93
Page Length	ESC C	1B 43	27 67	Set page length (line)	4-94
	ESC C NUL	1B 43 00	27 67 0	Set page length (inch)	4-95
Skip Perforation	ESC N	1B 4E	27 78	Skip (n) lines	4-97
	ESC O	1B 4F	27 79	Clear skip perforation	4-97
Vertical Tab	ESC B	1B 42	27 66	Set vertical tab	4-99
	ESC b	1B 62	27 98	Set vertical tab (channel)	4-100
	ESC /	1B 2F	27 47	Select channel	4-100
Left or Right Margin	ESC I	1B 6C	27 108	Set left margin	4-102
	ESC Q	1B 51	27 81	Set right margin	4-102
Horizontal Tab	ESC D	1B 44	27 68	Set horizontal tab	4-104

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Bit Image Graphic Mode	ESC K	1B 4B	27 75	60 DPI	4-105
	ESC L	1B 4C	27 76	120 DPI	4-107
	ESC Y	1B 59	27 89	120 (half) DPI	4-107
	ESC Z	1B 5A	27 90	240 DPI	4-107
	ESC *	1B 2A	27 42	60~240 DPI	4-108
	ESC ?	1B 3F	27 63	Change bit image graphic mode	4-110
	ESC ^	1B 5E	27 94	9-pin bit image graphics	4-111
Down-load	ESC :	1B 3A	27 58	Copy ROM characters	4-113
	ESC &	1B 26	27 38	Define download characters	4-114
	ESC %	1B 25	27 37	CG definition	4-121
International Character	ESC R	1B 52	27 82	Select international characters	4-123
MSB Control	ESC #	1B 23	27 35	Clear MSB control	4-126
	ESC =	1B 3D	27 61	Set MSB=0	4-126
	ESC >	1B 3E	27 62	Set MSB=1	4-126
Print Table Control	ESC 6	1B 36	27 54	Upper code area control	4-128
	ESC 7	1B 37	27 55	Code area control	4-128
Code Area Control	ESC I SOH	1B 49 01	27 73 1	Print table	4-129
	ESC I NUL	1B 49 00	27 73 1	Code area table	4-129
Home Head	ESC <	1B 3C	27 60	Home head	4-130

	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
Empha-sized Print	ESC E	1B 45	27 69	Set emphasized print	4-132
	ESC F	1B 46	27 70	Clear emphasized print	4-132
Double Strike Print	ESC G	1B 47	27 71	Set double strike print	4-133
	ESC H	1B 48	27 72	Clear double strike print	4-133
Underline	ESC — SOH	1B 2D 01	27 45 1	Start underline	4-134
	ESC — NUL	1B 2D 00	27 45 0	Stop underline	4-134
Super/Subscript Character	ESC S NUL	1B 53 00	27 83 0	Superscript character command	4-135
	ESC S SOH	1B 53 01	27 83 1	Subscript character command	4-135
	ESC T	1B 54	27 84	Clear super/subscript characters	4-135
Double Width Print	ESC W SOH	1B 57 01	27 87 1	Select double width characters	4-136
	ESC W NUL	1B 57 00	27 87 0	Clear double width characters	4-136
Combina-tion Print	ESC !	1B 21	27 33	Set print mode	4-137
Italic Print	ESC 4	1B 34	27 52	Set italic print	4-141
	ESC 5	1B 35	27 53	Clear italic print	4-141
Propor-tional Spacing	ESC p SOH	1B 70 01	27 112 1	Set proportional spacing	4-142
	ESC p NUL	1B 70 00	27 112 0	Clear proportional spacing	4-142
Dot Spacing	ESC (SP)	1B 20	27 32	Set dot spacing	4-144
Dot Position	ESC \$	1B 24	27 36	Set absolute dot position	4-145
	ESC \	1B 5C	27 92	Set relative dot position	4-146

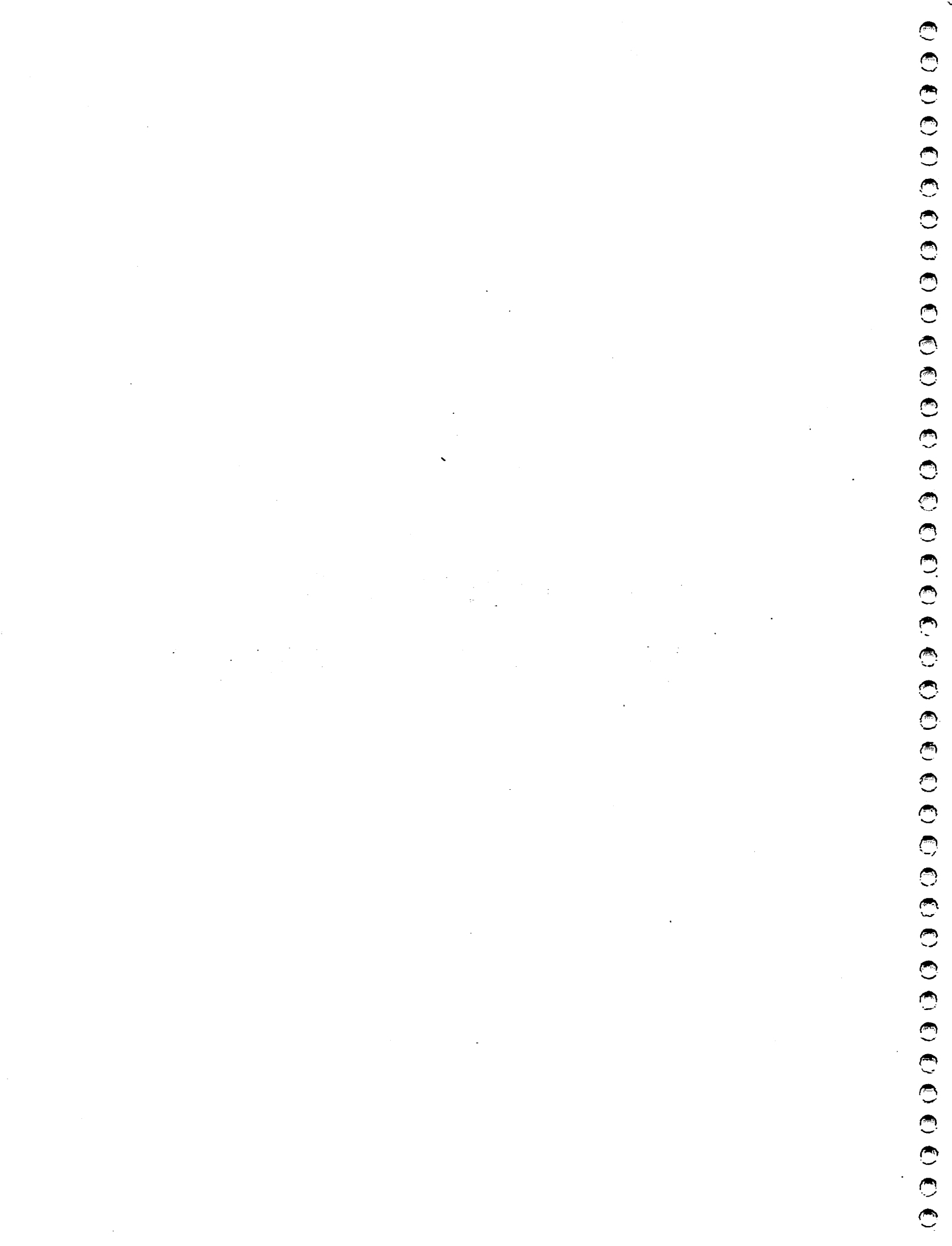
	Code Name	Hex. Code	Dec. Code	Function	Ref. Page
PE De-tection	ESC 8	1B 38	27 56	PE ineffective	4-149
	ESC 9	1B 39	27 57	PE effective	4-149
Printer Reset	ESC @	1B 40	27 64	Printer reset	4-150





# **APPENDIX A**

## **PARALLEL INTERFACE**



---

# 1 Interface Description

---

## 1.1 Data Input Method

8-bit Parallel Interface

## 1.2 Control Signals

$\overline{\text{ACK}}$ ,  $\overline{\text{BUSY}}$ ,  $\overline{\text{SELECT}}$ ,  $\overline{\text{PE}}$ ,  $\overline{\text{DATA.STB}}$ ,  $\overline{\text{INPUT.PRIME}}$ ,  $\overline{\text{FAULT}}$ , INPUT BUSY

## 1.3 Data Buffer

10K Bytes (Refer to table 3-2)

Data can be received while printing is taking place until the receive buffer becomes full.

---

## 2 Input/Output Signals

---

### 2.1 DATA 1-8

- 2.1.1 Receive data, bits 1 through 8.
- 2.1.2 Logic 1 is a high level. The minimum pulse width is 3  $\mu$ sec. DATA 1 is the LSB (Least Significant Bit), and DATA 8 is the MSB (Most Significant Bit).

### 2.2 $\overline{\text{DATA.STB}}$ (DATA.STROBE)

- 2.2.1 Input timing signal for receiving the above DATA 1-8.
- 2.2.2 Normally high level; low level indicates valid incoming data.
- 2.2.3 The minimum pulse width is 1  $\mu$ sec.

### 2.3 $\overline{\text{ACK}}$ (ACKNOWLEDGE)

- 2.3.1 An output pulse which requests the host to send data.
- 2.3.2 This signal is output after processing the data code received from the host.
- 2.3.3 Normally high level; low level to generate  $\overline{\text{ACK}}$ .
- 2.3.4 The nominal pulse width is approx. 5  $\mu$ sec.
- 2.3.5 The  $\overline{\text{ACK}}$  signal is also output when the printer status changes from OFF LINE to ON LINE or the BUSY signal changes from the high to low level.

### 2.4 INPUT BUSY (BUSY)

- 2.4.1 Signal which indicates that the printer is busy.
- 2.4.2 If the host sends data after this signal becomes active, the sent data may be lost.
- 2.4.3 Conditions causing this signal to be a high level (BUSY) are:
  - a. The data buffer became full.
  - b. Printer goes OFF LINE.
  - c. Printer fault status.
  - d. Input of  $\overline{\text{INPUT.PRIME}}$ . The BUSY signal is reset after the previously set time, if  $\overline{\text{INPUT.PRIME}}$  is high.
  - e. While in operation, if the printer cannot catch up with received data.

### 2.5 SELECT

- 2.5.1 An output signal which indicates if the printer can receive data or not. A high level signal is sent to the host when the printer is ready to receive data.
- 2.5.2 Conditions causing this signal to be a high level (SELECT) are:
  - a. The **ON LINE** switch is activated while the printer is OFF LINE. If the **ON LINE** switch is pressed in a PE state with no data in the buffer, the printer is temporarily placed ON LINE and the PE state is cleared. This allows one line of data to be input and printed, and then the printer returns to the OFF LINE state due to the PE condition.

- b. Reception of the DC1 code. However, if the DC1 code is received in a PE state, the printer will not be selected.
- c. The printer power is turned on when the printer isn't busy.

2.5.3 Conditions causing this signal to be a low level (DESELECT) are:

- a. The **ON LINE** switch is activated while the printer is ON LINE.
- b. Reception of DC3 (E-Mode) or ESC Q 3 (I-Mode).
- c. Occurrence of a printer error (head carrier overrun or failure in initialization at power on).
- d. PE or Cover Open is detected.

## 2.6 **INPUT PRIME**

- 2.6.1 This input signal resets the printer to the initial state; however, this signal does not affect Download character set condition and print quality.
- 2.6.2 Upon receipt of this signal, all data stored in the DATA BUFFER will be printed; the printer will then return to the initial state.
- 2.6.3 This signal is normally HIGH. **INPUT PRIME** is active when the signal is LOW.
- 2.6.4 Minimum pulse width is 1 microsecond.
- 2.6.5 After receiving an **INPUT PRIME**, allow a delay time (5 ms.) until next data is received.

## 2.7 **FAULT**

- 2.7.1 This is an output signal from the printer indicating printer FAULT state.
- 2.7.2 The signal is LOW during a FAULT state.
- 2.7.3 FAULT state occurs under any of the following conditions:
  - a. Under a PE state. (However, if the SEL switch is depressed during a FAULT state, the FAULT signal will temporarily become HIGH, enabling the printing of one line before returning to LOW.)
  - b. Under a OFF LINE state.
  - c. An error or malfunction has occurred in the printer.
  - d. Cover Open is detected.

## 2.8 **PAPER EMPTY (PE)**

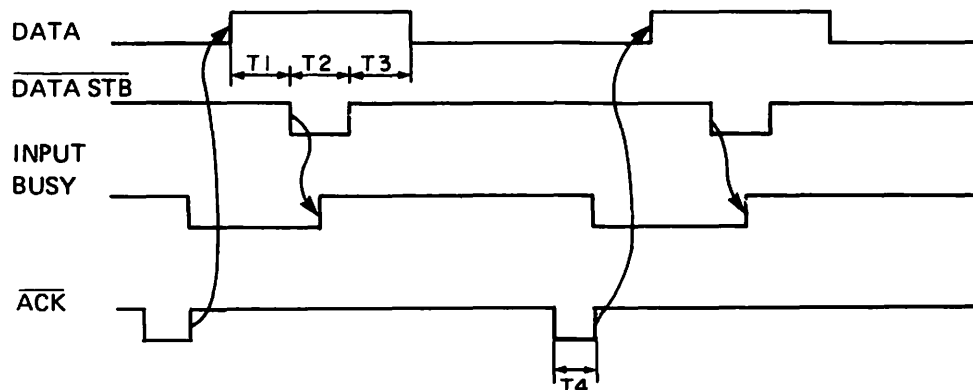
- 2.8.1 This is an output signal from the printer indicating that the paper end is near. PE status is also created when no paper is present.
- 2.8.2 This signal is activated by a micro switch located below the platen.
- 2.8.3 This signal is HIGH when active.

## 2.9 **+5V DC**

- 2.9.1 This is not a signal. This is a +5V DC power source to an outside device.
- 2.9.2 The maximum output current available is 50 mA.

# 3 Timing Chart

## 3.1 Data is being received



T1 ~ T3 Min. 1  $\mu\text{s}$   
T4 Approx. 5  $\mu\text{s}$

Fig. Appendix 3-1 Timing Chart A

## 3.2 Data buffer goes full

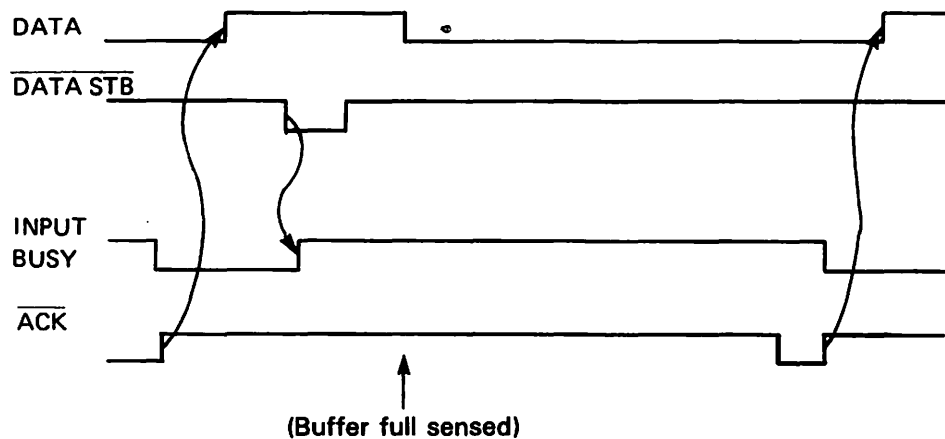
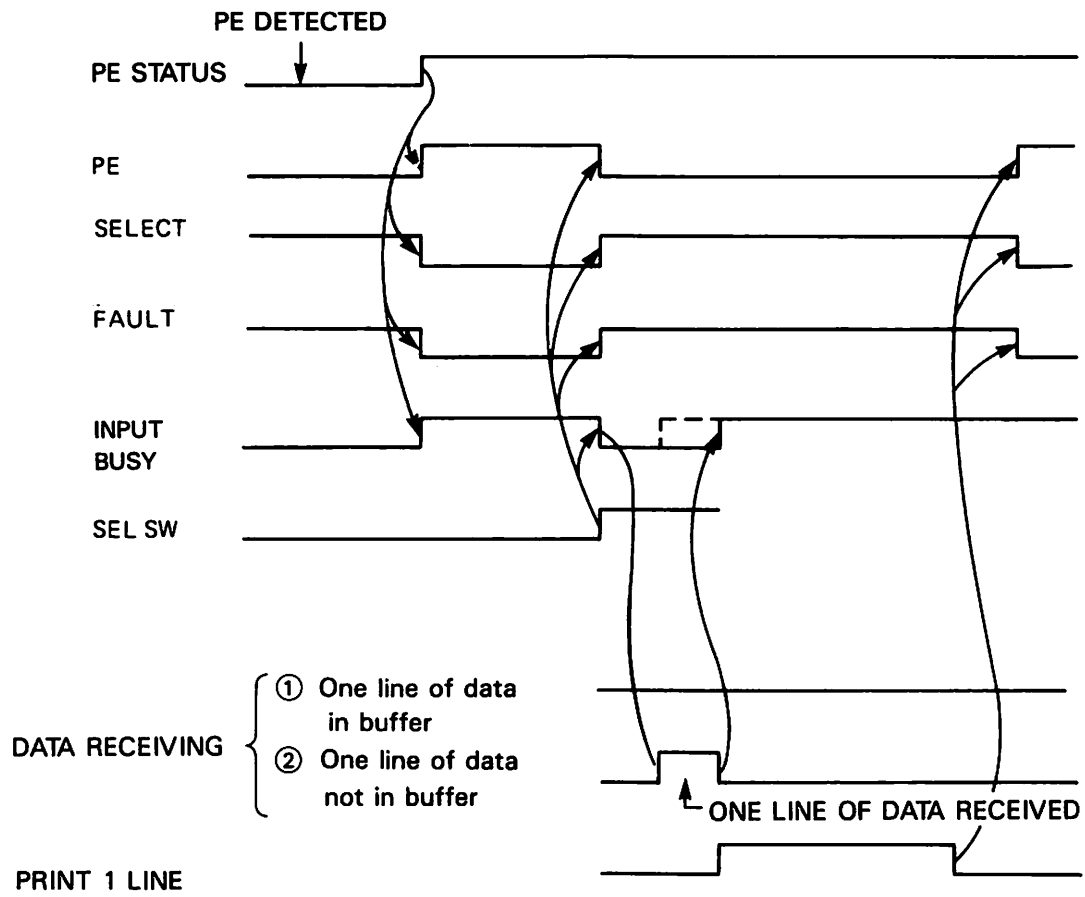


Fig. Appendix 3-2 Timing Chart B

### 3.3 PE is detected



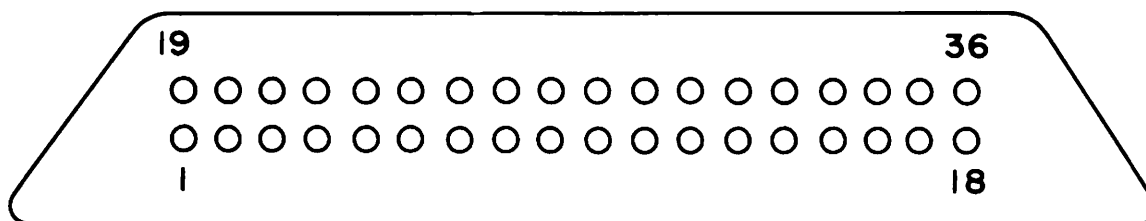
NOTE: In case that one or more lines of data are stored in the buffer.

Fig. Appendix 3-3 Timing Chart C



## 4 Interface Connector Pin Assignments

PIN No.	SIGNAL NAME	PIN No.	SIGNAL NAME
1	DATA STROBE	19	TWISTED PAIR GND
2	DATA 1	20	TWISTED PAIR GND
3	DATA 2	21	TWISTED PAIR GND
4	DATA 3	22	TWISTED PAIR GND
5	DATA 4	23	TWISTED PAIR GND
6	DATA 5	24	TWISTED PAIR GND
7	DATA 6	25	TWISTED PAIR GND
8	DATA 7	26	TWISTED PAIR GND
9	DATA 8	27	TWISTED PAIR GND
10	ACK	28	TWISTED PAIR GND
11	INPUT-BUSY (BUSY)	29	TWISTED PAIR GND
12	PE	30	INPUT PRIME RETURN
13	SELECT	31	INPUT PRIME
14	NC	32	FAULT
15	NC	33	0V
16	0V	34	NC
17	CHASSIS GND	35	NC
18	+5V	36	NC



Printer Connector: AMPHENOL 57-40360

Cable Connector: AMPHENOL 5740360

# 5 Signal Electrical Characteristics

## 5.1 Signal Level

### Input

"High" level 2.4 to 5V

"Low" level 0 to 0.4V

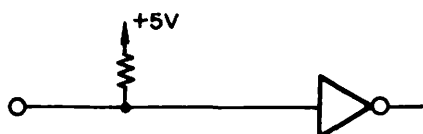
### Output

"High" level 2.4 to 5V

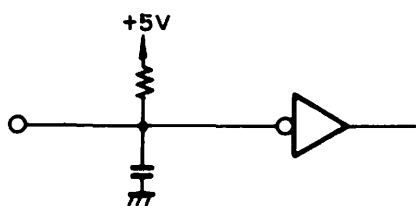
"Low" level 0 to 0.4V

## 5.2 Input/Output Gate

### ① Input Gate

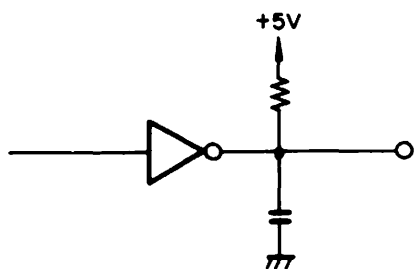


- DATA1 ~ 8

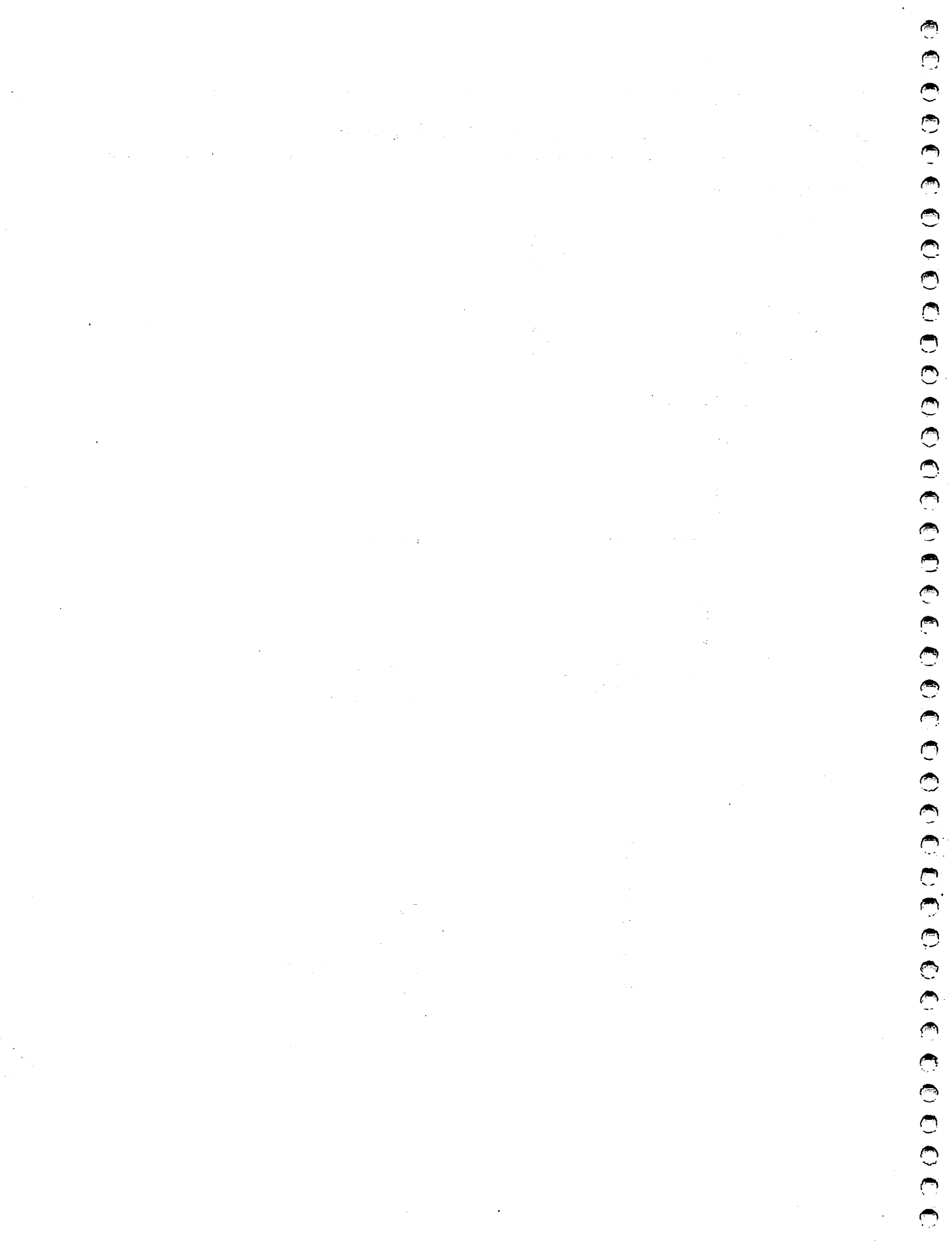


- $\overline{\text{DATA STB}}$
- $\overline{\text{INPUT PRIME}}$

### ② Output Gate

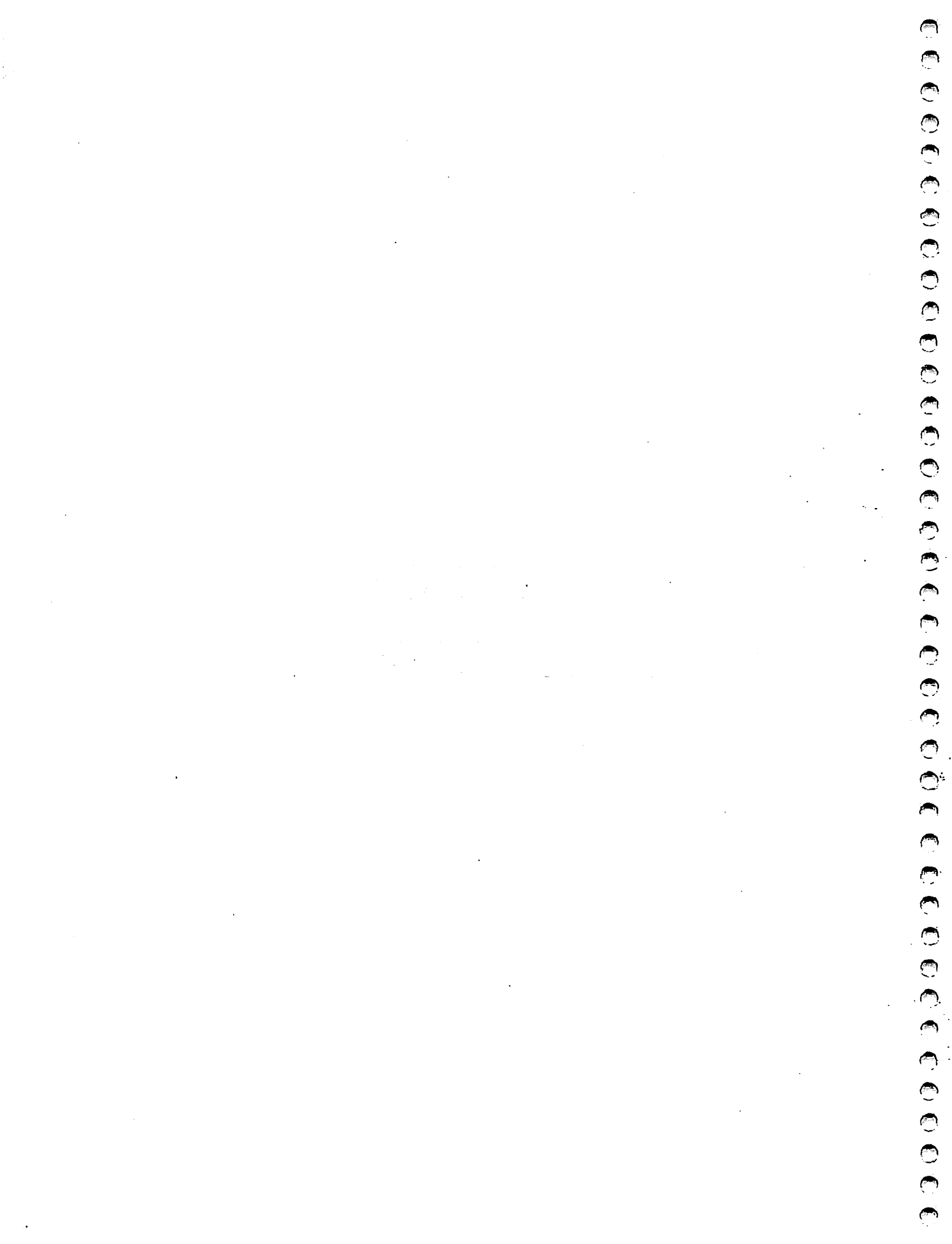


- SELECT
- $\overline{\text{FAULT}}$
- $\overline{\text{ACK}}$
- INPUT BUSY (BUSY)
- PE



# **APPENDIX B**

## **PAPER SPECIFICATIONS**



# 1 Fanfold Computer Forms

## 1.1 Print Location and Form Sizes

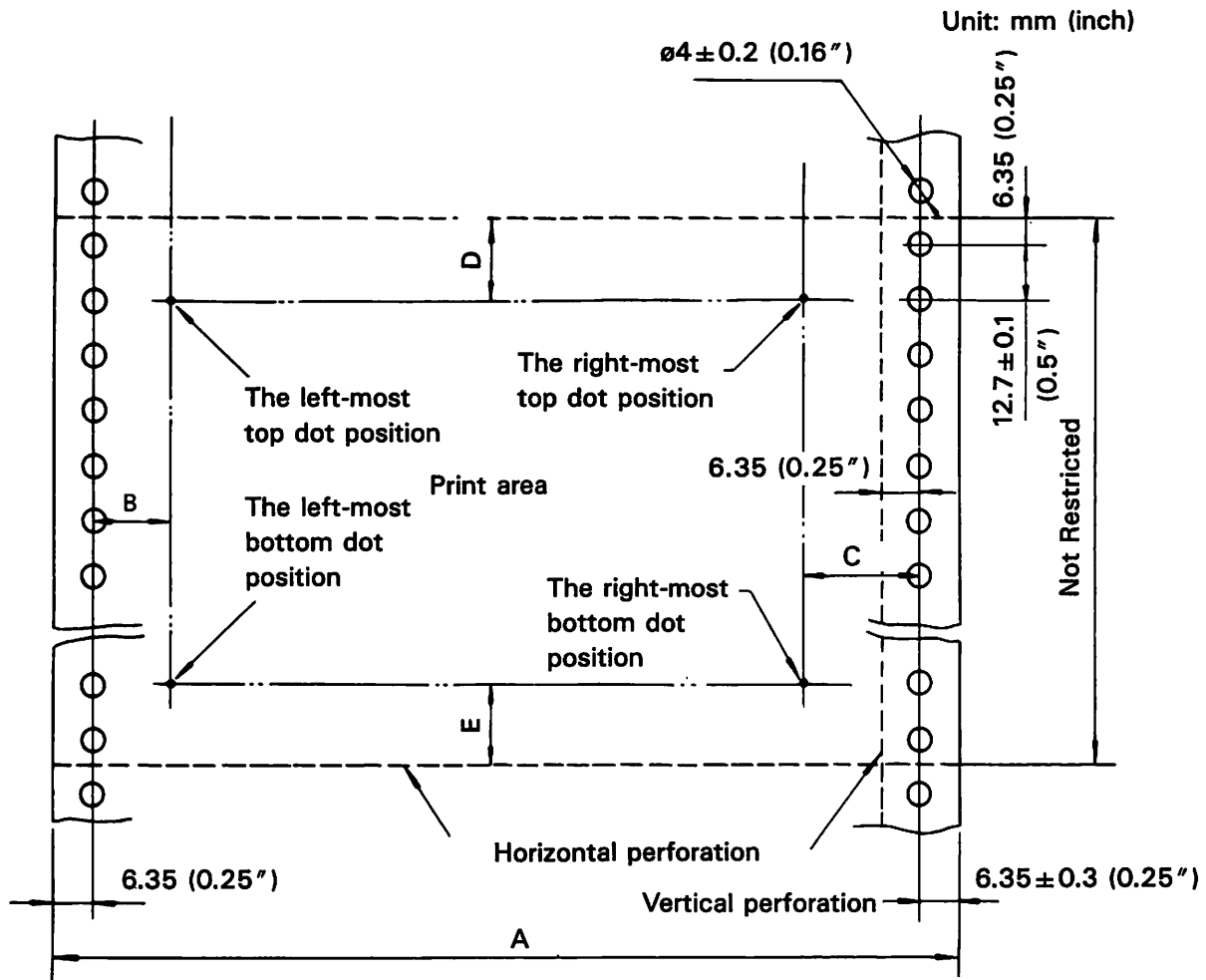


Fig. Appendix B 1-1 Fanfold Paper Dimension Specifications

Dimension	Size	Remarks
A	108 — 254 mm (4.25" — 10") (8510) 108 — 381 mm (4.25" — 15") (1550)	Width of a Paper Form
B	6 mm (0.24")	The distance from the center of a sprocket hole to the end of print area is 6.0 mm min.
C	12 mm (>0.47")	Recommended to allow the distance to be more than 12 mm in actual operation.
D	25.4 mm (1")	The area should not be printed to avoid print blurs.
E	25.4 mm (1")	Same as D, but the area in the last paper form is susceptible to print pitch disorder and print blurs.

## 1.2 Recommendations for Paper Types and Number of Copies

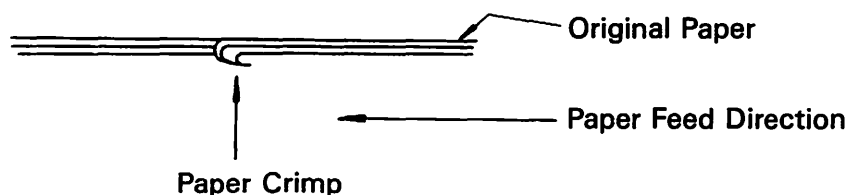
Paper Form	Total Weight of Paper* (kg)	Number of Copies**	Glued or Dotted on both sides	Paper Crimped on both sides	Free on Both Sides
Fine quality paper with no carbon	55 ~ 70	1	—	—	—
Paper with carbon	45	3	0	x	x
	45 ~ 55	2	0	0	x
Impact paper	30 ~ 43	4	0	x	x
	34 ~ 45	3	0	x	x
	43 ~ 55	2	0	0	x
Carbon backed paper	34 ~ 45	3	0	x	x
	43 ~ 55	2	0	0	x

### Remarks:

- \*1. The total weight of paper forms per 1000 sheets.  
Paper size (788 mm × 1098 mm)
- \*\*2. Always include the original page in determining the number of copies.  
Never use paper with a thickness exceeding 0.28 mm.

## 1.3 Glued and Crimped Form

- (1) The paper carbon is attached to the vertical edges of the original and duplicate forms by a thin line of glue.
- (2) The paper crimped portion should be bent to the back side of the last duplicate.



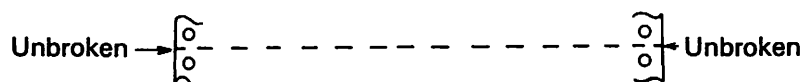
- (3) No more than 3 paper crimps should be used with multi-part paper in order to avoid gaps in printing.
- (4) Multipart forms should be meshed or glued together on both sides of the sprocket holes within 1/2" from the edges of the paper.
- (5) Multipart forms should be meshed or glued together on both sides. Other paper types such as loose sheets (not held together at all) should not be used for making duplicates.
- (6) To avoid damage to printer do not use any staples in any printer paper.
- (7) The meshed or glued portion of any printer paper should be clean and free from folds.

#### 1.4 Perforation

- (1) The perforated peak of the opened paper when laid flat should be no higher than 0.5 mm from the resting edges.



- (2) The perforations cause the paper to fold in an accordion-like fashion.
- (3) Perforated line ends should not be torn.



- (4) There should be no break in the perforations.
- (5) Vertical perforations should be located within 1/2" of the paper edges and should be clean with no tears or folds.

**Note:** Reverse feed should be performed within each horizontal perforation.



## 2. Single Sheet Paper

### 2.1 Print Location and Form Size

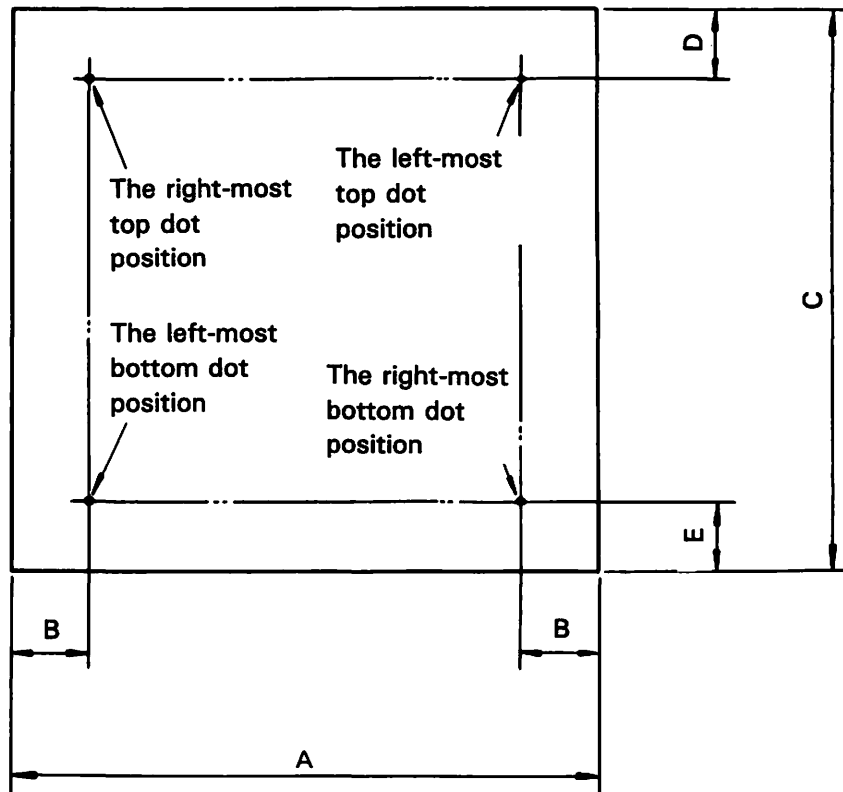


Fig. Appendix B 2-1 Sheet Paper Dimension Specifications

Dimension	Size	Remarks
A	108 — 254 mm (4.25" — 10") (8510) 108 — 381 mm (4.25" — 15") (1550)	Paper width
B	12.7 mm Min (0.5" Min)	The distance from the sides of papers to the most right and left dot position
C	127 — 305 mm (5" — 12")	Length of a paper form
D, E	25.4 mm Min (1" Min)	These areas at the top and bottom of a page should not be printed.

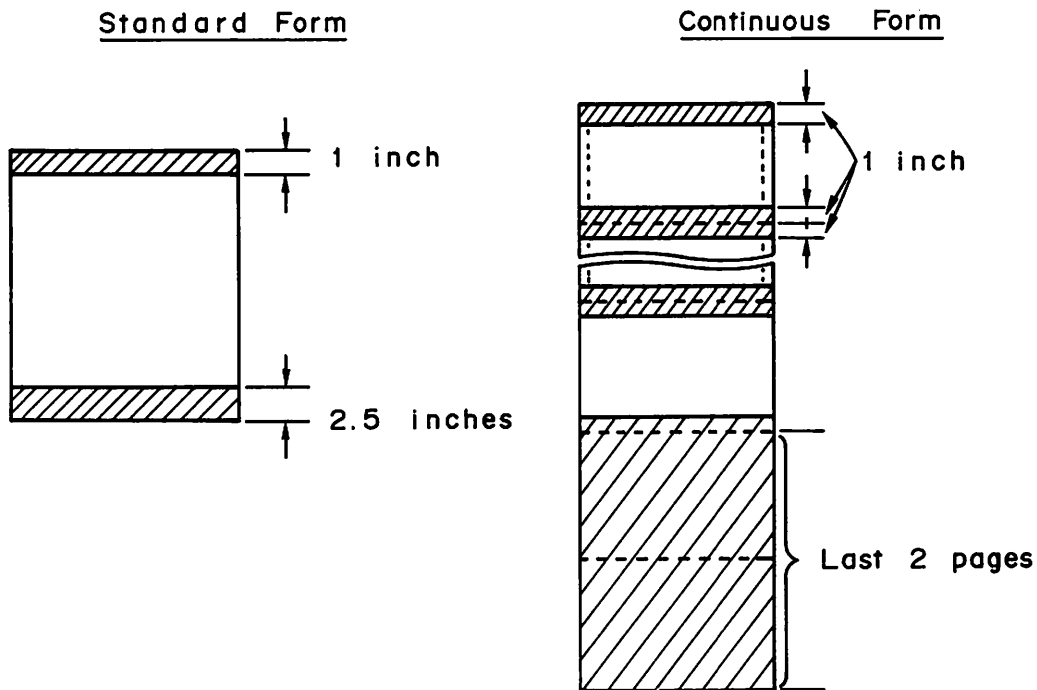
## 2.2 Form Types and Copy Quantities

Paper Form	Total Weight of Forms	Number of Copies
Fine quality paper form	30 ~ 55 kg.	1
Fine quality paper with carbon	30 ~ 45	3
	43 ~ 55	2
Carbonless paper and carbon backed paper	30 ~ 45	3
	43 ~ 55	2

## 3 Reverse Line Feed Limitations

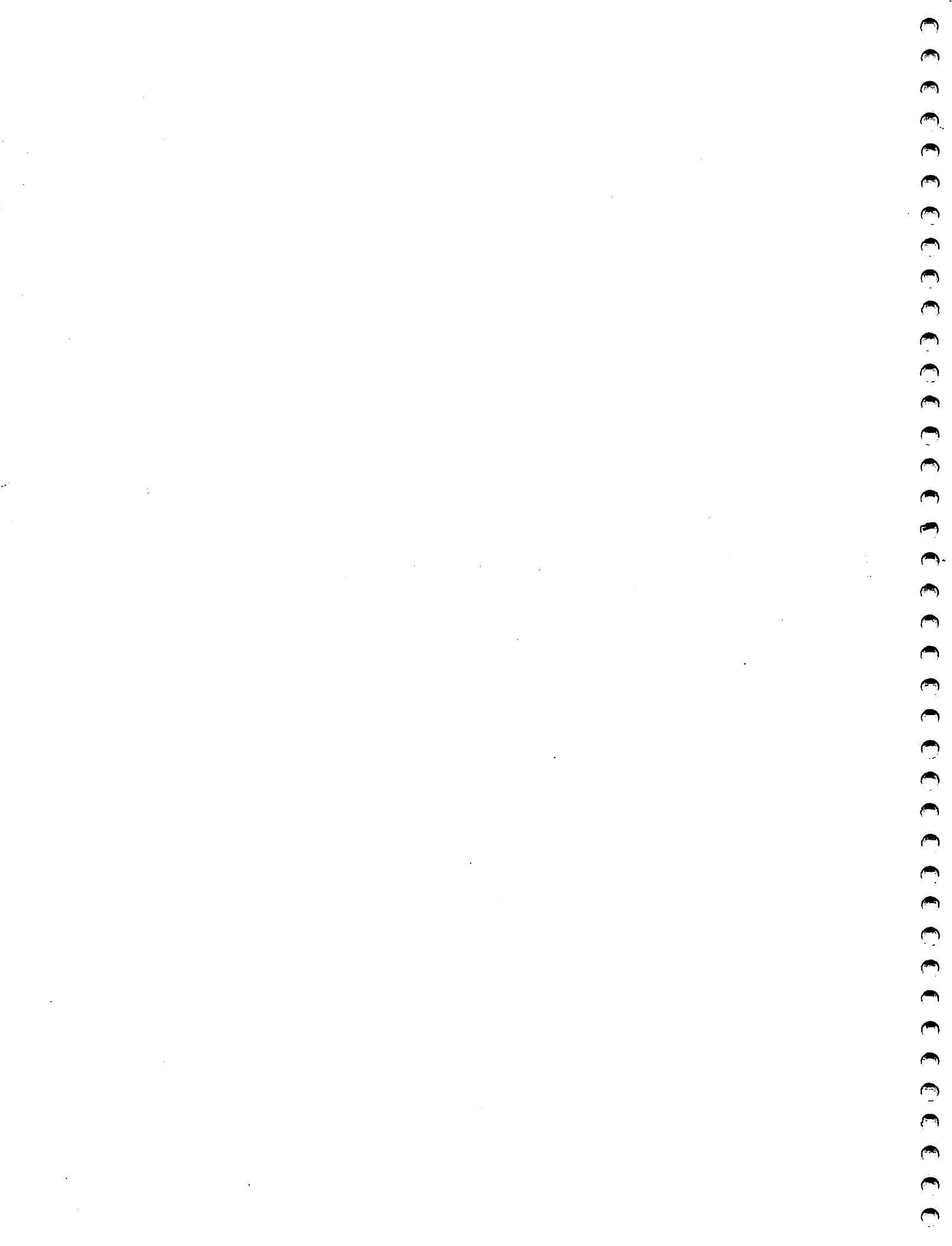
### Conditions for Reverse Line Feed

- ① Possible only in friction feed and in the push tractor feed.
- ② Possible only with 1-part forms.
- ③ Prevent the perforation of continuous forms from passing the head top.
- ④ Prevent the areas (hatched parts), shown in the figure below, from being placed at the head top.



# **APPENDIX C**

## **DUTY CYCLE**



# 1. Duty Cycle

When continuous printing is to be performed, determine the conditions of operation according to the following procedures:

## 1.1 Determining the Head Duty

The head duty refers to the number of dots printed in one minute, and is expressed as follows:

$$DH = T.P.S. \times N.C. \times N.D.$$

DH: Number of dots printed in one minute [dots/min]

T.P.S.: Number of lines printed in one minute [lines/min]

N.C.: Average number of characters printed in one line [characters/line]

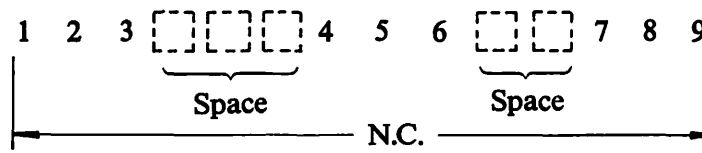
N.D.: Average number of dots in one character [dots/character]

### 1.1.1 T.P.S. (Through-put speed)

Please refer to the diagram (Figure C1-1) showing the relationship between the through-put and the column number in one line on this model C-210/15. (This data has been obtained from measurements performed on a simulator of our company. Please acknowledge that, depending on the type of host computer employed, the data obtained from your printer may differ from this one.)

### 1.1.2 N.C.

It refers to the number of characters in one line, that is, the number of columns printed in one line from the leftmost to the rightmost characters. (When the through-put is being determined, the spaces inserted between words are included in the columns.)



### 1.1.3 N.D.

It refers to the average number of dots which compose a character. The average numbers of dots for ordinary characters of C-210/15 are shown below:

For the draft mode printing: 12.4 dots/character

For the normal mode printing:

96 characters of ASCII: 12.7 dots/character

160 characters of JIS: 12.3 dots/character

Proportional characters: 20.0 dots/character

Please determine the average number of dots for the graphic and bit images by character generator according to the actual patterns, using the 8 x 8 matrix as reference.

## 1.2 Determining the Duty Cycle

When the head duty has been determined, plot it on the axis of ordinates in Figure C1-2 and extend it vertically until it intersects with 4 curves, which show the differences in the machine's operation that are caused by the differences of the length of time the machine has not been used before it is employed for continuous printing. Select the curve which agrees with the actual condition, and note the reading on the axis of abscissas which corresponds to the intersecting point of the curve and vertical line. The reading indicates the length of time continuous printing can be performed from now on in the unit of minute.

### 1.3 Example

Condition: Pica mode; ASCII 96 characters printed at random; 80 columns full printing; bi-directional; the printer not in use for more than 60 minutes

T.P.S.=74 lines/min (Attached graph-1)

N.C.=80 characters/line (Under the above condition)

N.D.=12.7 dots/character (From item 1.1.3)

DH=74 x 80 x 12.7=75,184=76,000 dots/min

By plotting the head duty on the axis of ordinates in Figure D1-3 at  $7.6 \times 10^4$  (A) and by observing the reading (C) on the axis of abscissas corresponding to the intersecting point (B) of line (A) and the curve representing the case when the printer has not been in use for more than 60 minutes, a time length of 40 minutes is obtained. Accordingly, the printer can print continuously for 40 minutes under the above condition. Then, suppose that, after the printer was used for 40 minutes continuously, a recess of 5 minutes has been taken, and printing is to be continued in a similar way. The intersecting point of (A) and the curve which represents the case when the printer has not been in use for more than 5 minutes, corresponds to reading (F) on the axis of abscissas, which shows 8.5 minutes. In other words, another period of 8.5 minutes of continuous printing is possible until the next recess time.

### 1.4 Limit Time

When applying this duty cycle, make sure that the following conditions are complied with:

- (1) The ambient temperature shall be 25°C or lower.
- (2) The duty on any of the dot pins shall be 30% or less of the head duty.
- (3) The time length for continuous printing per day should not exceed 12 hours.
- (4) The cycle of pause-operation should not be extended over 12 hours per day.
- (5) For continuous printing of 200,000 dots/min or more a resting period shall be 60 minutes or more.

### 1.5 Reference

The head duty under each mode using a simulator of our company is given below:

- (1) Bidirectional full column printing  
with no spacing; bit image; 318,000 dots/min  
Proportional mode:
- (2) Bidirectional full column printing  
with no spacing; bit image; 375,000 dots/min  
Pica mode:
- (3) Bidirectional full column printing  
with no spacing; bit image; 267,000 dots/min  
Elite mode:
- (4) Unidirectional full column printing  
with no spacing; bit image; 222,000 dots/min  
Pica mode:
- (5) Bidirectional full column printing  
of ASCII 96 characters; 104,000 dots/min  
Draft mode:
- (6) Bidirectional full column printing  
of ASCII 96 characters; 75,000 dots/min  
Pica mode:
- (7) Bidirectional full column printing  
of ASCII 96 characters; 55,000 dots/min  
Elite mode:

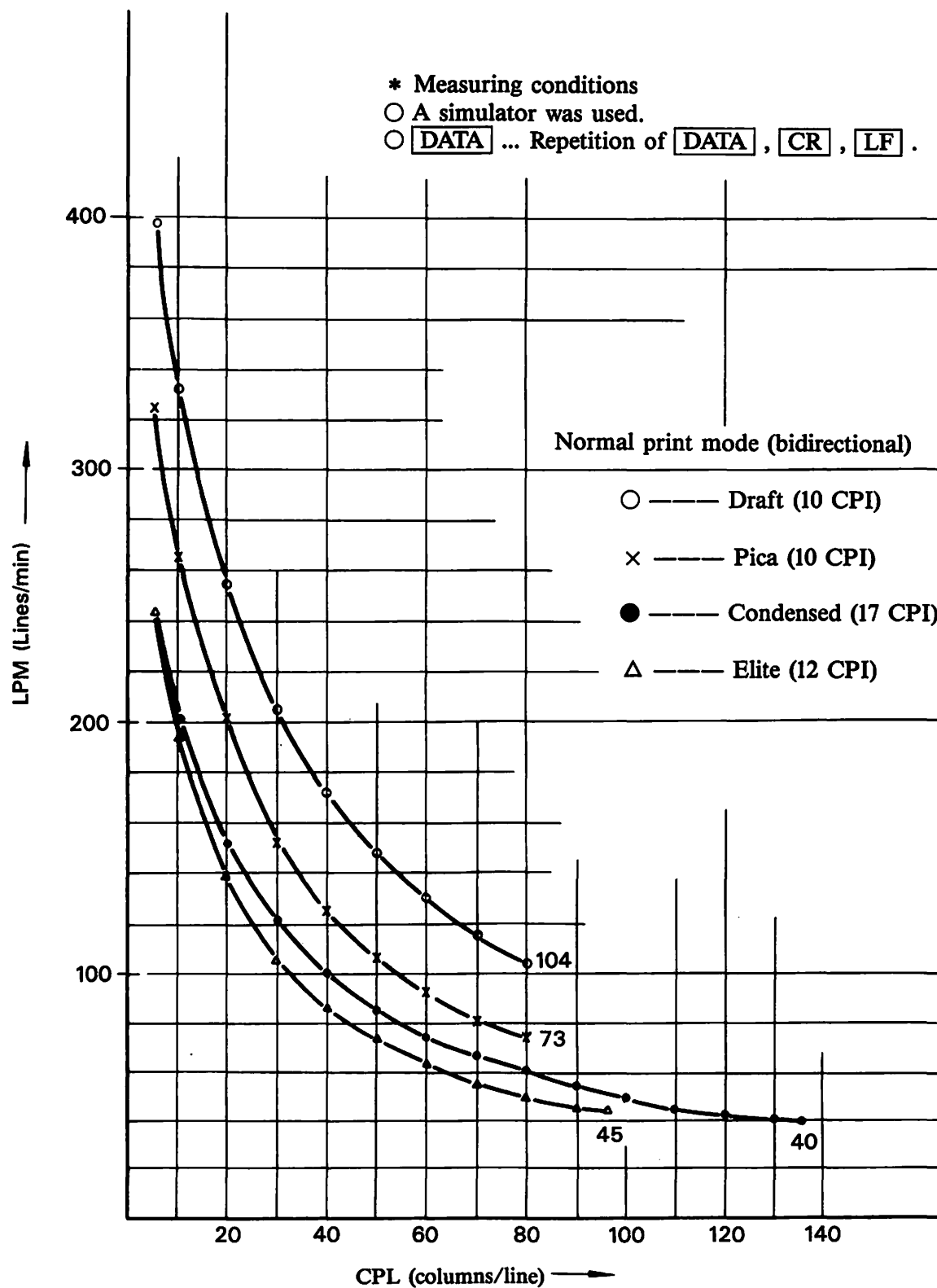


Fig. Appendix C 1-1 Through-put of C-210/15



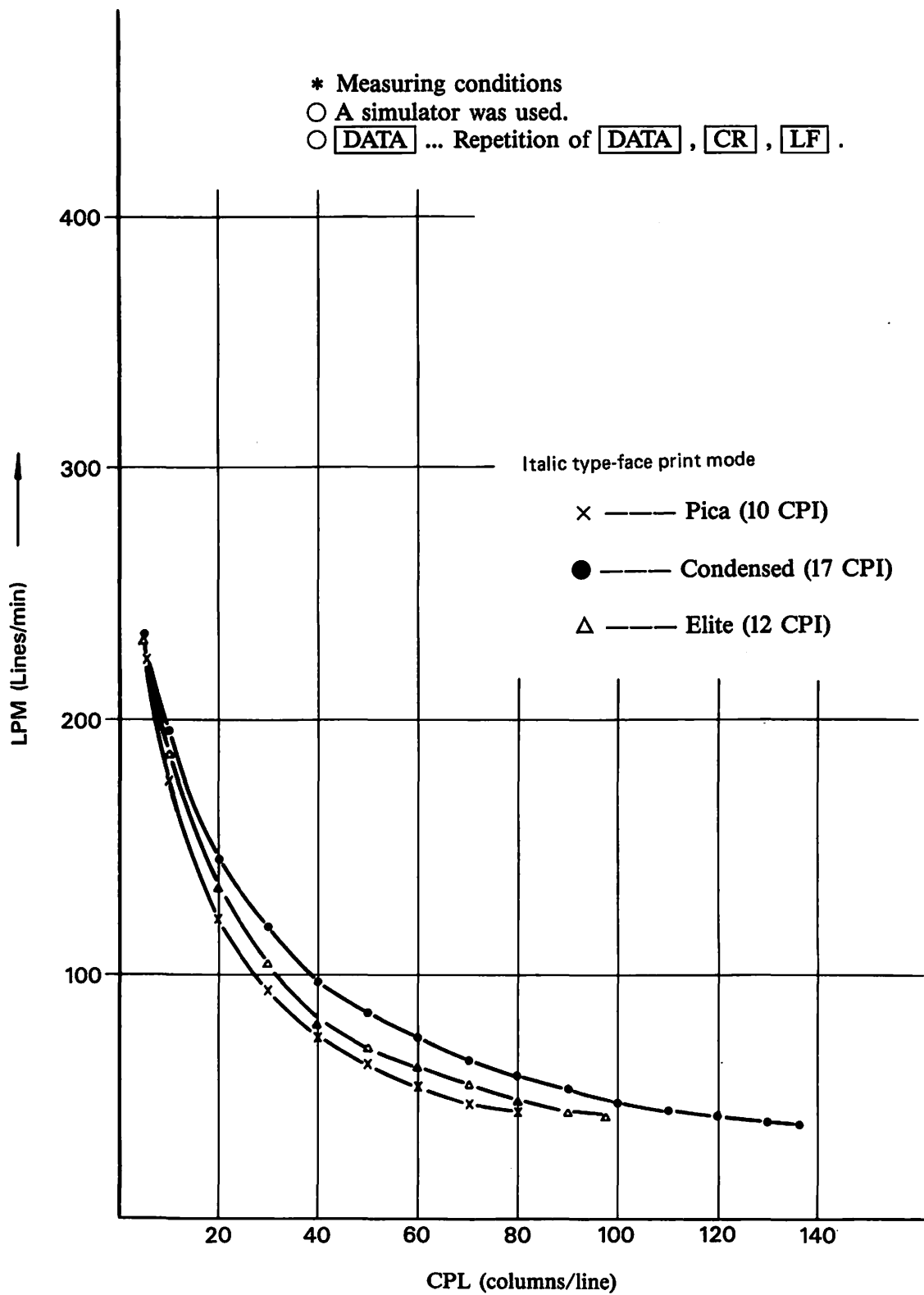


Fig. Appendix C 1-2 Through-put of C-210/15 (B)

**Conditions:**

- (1) The ambient temperature shall be normal (25°C)
- (2) The duty on any of the dot pins shall be 30% or less of the head duty (dots/min).

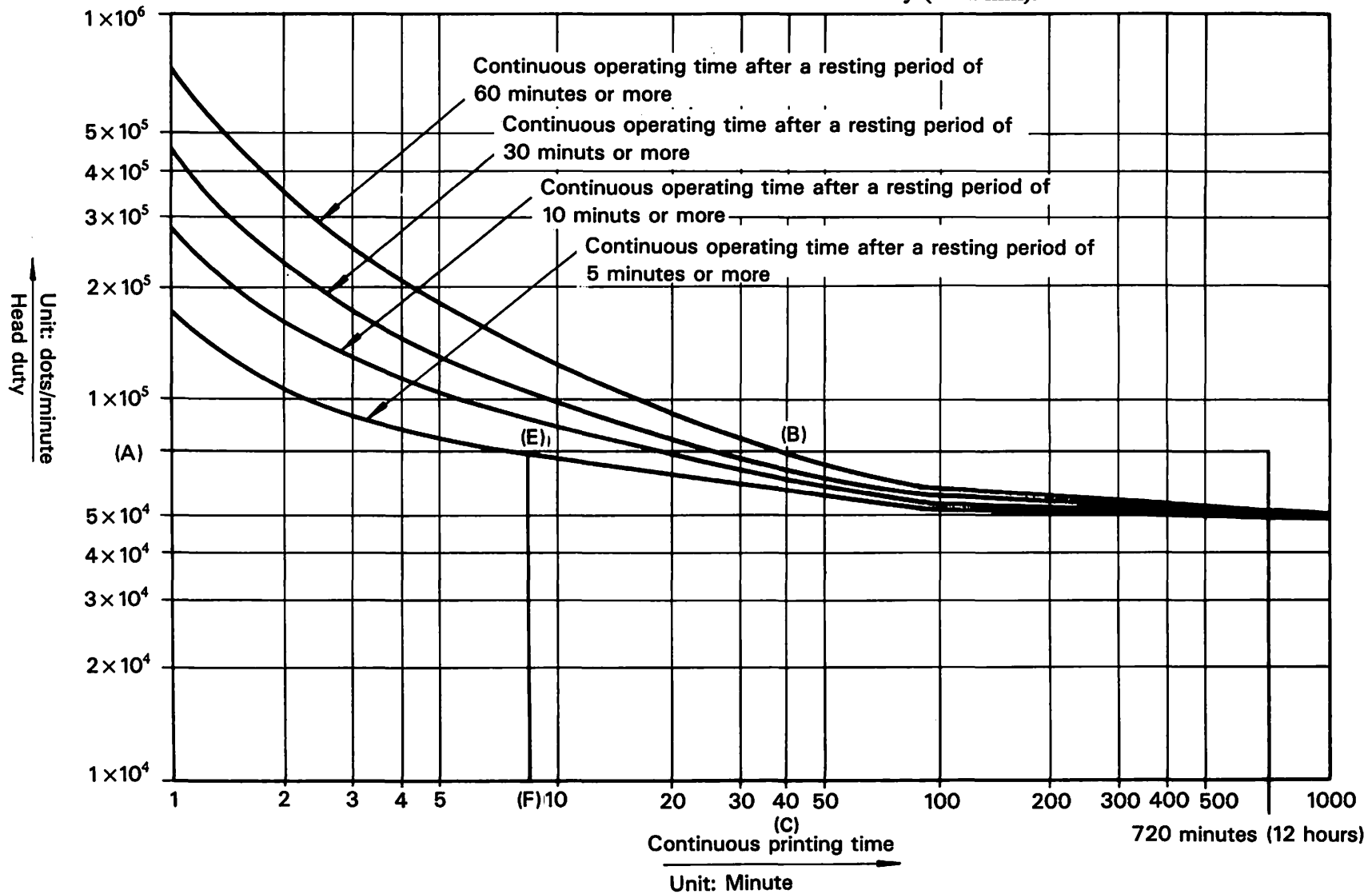


Fig. Appendix C 1-3 Duty Cycle of C-210/15



# Glossary (for IBM)

## IBM Mode

CODE	FUNCTION	PAGE			
ESC (SP)	Dot Spacing	4-60	ESC O	Clear Skip	4-31
ESC !			ESC P	Proportional Spacing	4-59
ESC "			ESC Q ETX	Deselect Printer	4-63
ESC #			ESC R	Initialize Tabs	4-36
ESC \$			ESC S	Super/Subscript Character	4-56
ESC %			ESC T	Clear Super/Subscript Character	4-56
ESC &				Print Direction	4-19
ESC ' (			ESC U		
ESC ' )			ESC V		
ESC *			ESC W	Double Width Print	4-57
ESC +			ESC X		
ESC ' ,			ESC Y	120 DPI (Half)	4-40
ESC -	Underline	4-55	ESC Z	240 DPI (Half)	4-40
ESC /			ESC [		
ESC 0	1/8" Line Feed	4-25	ESC \	Select All Character Print Mode 1	4-49
ESC 1	7/72" Line Feed	4-25	ESC ]	Select Reverse Line Feed	4-24
ESC 2	1/6" Line Feed	4-25	ESC ^	Select All Character Print Mode 2	4-50
ESC 3	n/216" Line Feed	4-27	ESC _	Overscore	4-58
ESC 4	Set TOF	4-37	ESC ' (		
ESC 5	Automatic Line Feed	4-23	ESC a		
ESC 6	Character Set 2	4-48	ESC d		
ESC 7	Character Set 1	4-48	ESC e		
ESC 8	PE Ineffective	4-62	ESC f		
ESC 9	PE Effective	4-62	ESC g		
ESC :	12 CPI (Elite)	4-21	ESC h		
ESC ;			ESC i		
ESC <	Home Head	4-51	ESC j		
ESC =	Definite Download Character	4-42	ESC k		
ESC >			ESC n		
ESC ?			ESC o		
ESC @			ESC p		
ESC A	Store n/72" Line Feed	4-26	ESC q		
ESC B	Set Vertical Tab	4-33	ESC s		
ESC C	Page Length Set	4-28, 4-29	ESC t		
ESC D	Set Horizontal Tab	4-35	ESC u		
ESC E	Set Emphasized Print	4-53	ESC v		
ESC F	Clear Emphasized Print	4-53	ESC w		
ESC G	Set Double Strike Print	4-54	ESC x		
ESC H	Clear Double Strike Print	4-54	ESC z		
ESC I	Select Print Quality Download	4-20 4-41	ESC {		
ESC J	Select (n)/216 Line Feed	4-22	ESC		
ESC K	60 DPI	4-38	ESC }		
ESC L	120 DPI	4-40	ESC SI	17.1 CPI (Condensed)	4-21
ESC M					
ESC N	Skip (n) Line	4-31			

# Glossary (for EPSON)

## EPSON Mode

CODE	FUNCTION	PAGE			
ESC (SP)	Dot Spacing	4-144	ESC O	Clear Skip Perforation (n)	4-97
ESC !	Set Print Mode	4-137	ESC P	10 CPI (Pica)	4-88
ESC "			ESC Q	Set Right Margin	4-102
ESC #	Clear MSB Control	4-126	ESC R	Set International Character	4-123
ESC \$	Select Absolute Dot Position	4-145	ESC S	Set Super/Subscript Character	4-135
ESC %	CG Definition	4-121	ESC T	Clear Super/Subscript Character	4-135
ESC &	Define Download Character	4-114		Print Direction	4-86
ESC ' (			ESC U		
ESC ' )			ESC V		
ESC * 60~240 DPI		4-108	ESC W	Double Width Characters	4-136
ESC +			ESC X		
ESC ' -	Underline	4-134	ESC Y	120 (Half) DPI	4-107
ESC /	Select Channel	4-100	ESC Z	240 DPI	4-107
ESC 0 1/8" Line Feed		4-91	ESC [		
ESC 1 7/72" Line Feed		4-91	ESC \	Select Relative Dot Position	4-146
ESC 2 1/6" Line Feed		4-91	ESC ]		
ESC 3 n/216" Line Feed		4-93	ESC _	9-pin Bit Image Graphics	4-111
ESC 4 Set Italic Print		4-141	ESC ' _		
ESC 5 Clear Italic Print		4-141	ESC a		
ESC 6 Upper Code Area Control		4-128	ESC b	Set Vertical Tab (Channel)	4-100
ESC 7 Code Area Control		4-128	ESC c		
ESC 8 PE Ineffective		4-149	ESC d		
ESC 9 PE Effective		4-149	ESC e		
ESC : Copy ROM Character		4-113	ESC f		
ESC ;			ESC g		
ESC < Home Head		4-130	ESC h		
ESC = Set MSB=0		4-126	ESC i		
ESC > Set MSB=1		4-126	ESC j	n/216" Reverse Line Feed	4-90
ESC ? Change Bit Image Graphic		4-110	ESC k		
ESC @ Printer Reset		4-150	ESC l	Set Left Margin	4-102
ESC A n/72" Line Feed		4-92	ESC m		
ESC B Set Vertical Tab		4-99	ESC n		
ESC C Page Length Set		4-94, 4-95	ESC o		
ESC D Set Horizontal Tab		4-104	ESC p	Proportional Spacing	4-142
ESC E Set Emphasized Print		4-132	ESC q		
ESC F Clear Emphasized Print		4-132	ESC s		
ESC G Clear Double Strike Print		4-133	ESC t		
ESC H Clear Double Strike Print		4-133	ESC u		
ESC I Code Area Control		4-129	ESC v		
ESC J (n)/216 Line Feed		4-89	ESC w		
ESC K 60 DPI		4-105	ESC x	Print Quality	4-87
ESC L 120 DPI		4-107	ESC y		
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			ESC		
			ESC }		

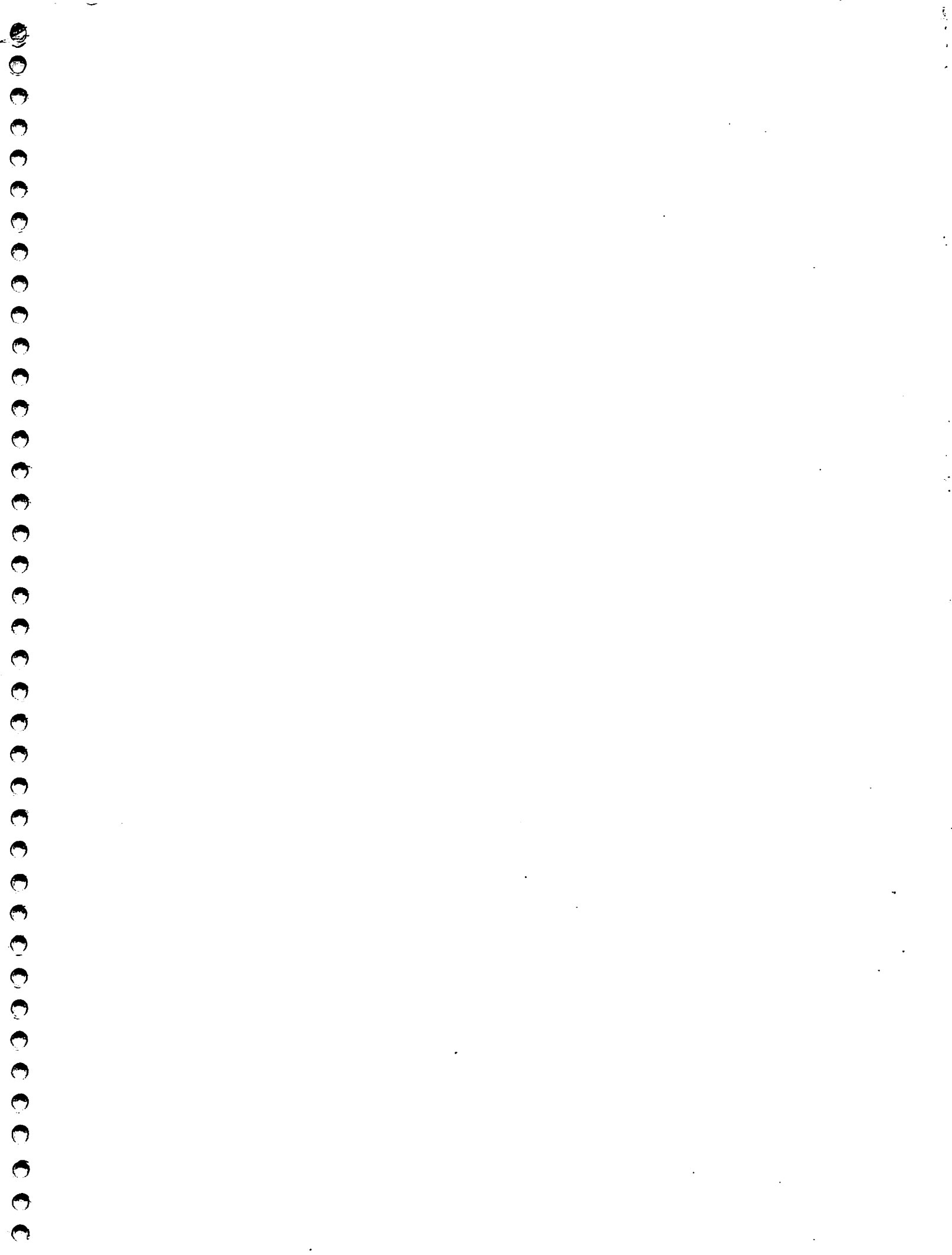
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## **C. ITOH DIGITAL PRODUCTS, INC. LIMITED WARRANTY**

C. Itoh Digital Products, Inc. warrants this product to be free from defects in material and/or workmanship for a period of one (1) year, commencing on the date of purchase by the initial buyer purchasing other than for purpose of resale. This warranty shall apply only if such buyer purchased the product in the United States.

If the product proves to be defective within the warranty period, C. Itoh Digital Products, Inc., at its discretion, will either repair or replace the product. This warranty applies only if the product fails to function properly under normal use and within the manufacturer's specifications. Optional accessories not contained in the original container (such as software and batteries) are excluded from warranty coverage.

This warranty is effective only if the buyer completes and returns, within thirty (30) days of purchase, the warranty card included with the product to:

C. Itoh Digital Products, Inc.  
Warranty Department  
1011 Francisco Street  
Torrance, California 90502

To obtain service under this warranty, the buyer must include a purchase receipt or other valid proof of original purchase, and the serial number of the product. When a request for warranty service is made, the buyer is responsible for returning the product properly packaged to an authorized C. Itoh Digital Products, Inc. service center or to the dealer from whom the product was purchased. Any postage, insurance or shipping costs incurred in presenting or sending the product for warranty service are the sole responsibility of the buyer. The buyer may call C. Itoh Digital Products, Inc. at (213) 327-5939 for the nearest authorized service center.

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Any questions regarding this warranty can be directed to C. Itoh Digital Products, Inc. at the address stated above.

**This warranty is effective only in the USA.**

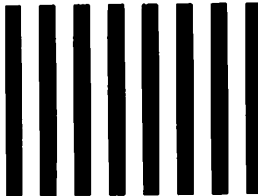


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### C. ITOH WARRANTY CARD

**PRINT OR TYPE**      **PLEASE RETURN THIS CARD WITHIN 30 DAYS OF PURCHASE SO THAT WE MAY BETTER SERVICE ANY WARRANTY CLAIM**

**YOUR NAME:** \_\_\_\_\_

**COMPANY:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**CITY:** \_\_\_\_\_ **STATE:** \_\_\_\_\_ **ZIP:** \_\_\_\_\_ **PHONE: (     )** \_\_\_\_\_

**PURCHASE DATE (MONTH/DATE/YEAR):** \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

**PURCHASED FROM:**

- |   |   |
|---|---|
| 1 <input type="checkbox"/> COMPUTER STORE | 3 <input type="checkbox"/> OFFICE PRODUCTS DEALER |
| 2 <input type="checkbox"/> SYSTEMS HOUSE  | 4 <input type="checkbox"/> MAIL ORDER HOUSE       |
| 5 <input type="checkbox"/> OTHER _____    |   |

**HOW DID YOU LEARN ABOUT OUR PRODUCT?**

- |  |   |
|--|---|
| 1 <input type="checkbox"/> COMP. STORE DISPLAY | 4 <input type="checkbox"/> MAGAZINE ADVERTISEMENT |
| 2 <input type="checkbox"/> USER RECOMMENDATION | 5 <input type="checkbox"/> SALES PERSON           |
| 3 <input type="checkbox"/> MAGAZINE ARTICLE    | 6 <input type="checkbox"/> OTHER _____            |

**REASON FOR PURCHASE:**

- |  |
|--|
| 1 <input type="checkbox"/> FIRST PRINTER PURCHASED?    |
| 2 <input type="checkbox"/> TO REPLACE EXISTING PRINTER |
| 3 <input type="checkbox"/> NEEDED ADDITIONAL PRINTER   |

**PRINTER WILL BE USED WITH THE FOLLOWING:**

IBM PC ☐ XT ☐ AT ☐ JR ☐ PORTABLE  
APPLE ☐ II ☐ IIe ☐ IIc ☐ MACINTOSH ☐ MAC +  
AT&T ☐ COMPAQ ☐ HP ☐ OTHER IBM COMPATIBLES \_\_\_\_\_  
COMMODORE ☐ 64 ☐ 128 ☐ AMIGA  
ATARI ☐ 800 XL ☐ 520ST ☐ 1040  
TANDY ☐ TELEVIDEO ☐ OTHER (SPECIFY) \_\_\_\_\_

**FOR USE PRIMARILY IN:**

- |  |   |
|--|---|
| 1 <input type="checkbox"/> PERSONAL/HOME/HOBBY | 4 <input type="checkbox"/> GOVERNMENT             |
| 2 <input type="checkbox"/> SMALL BUSINESS      | 5 <input type="checkbox"/> ENGINEERING/SCIENTIFIC |
| 3 <input type="checkbox"/> LARGE CORPORATION   | 6 <input type="checkbox"/> EDUCATION              |
| 7 <input type="checkbox"/> OTHER _____         |   |

**WHAT SOFTWARE PACKAGES DO YOU HAVE?:**

- |  |  |
|--|--|
| 1 <input type="checkbox"/> MANAGEMENT TOOL | 5 <input type="checkbox"/> HOME MANAGEMENT |
| 2 <input type="checkbox"/> WORD PROCESSING | 6 <input type="checkbox"/> HOME EDUCATION  |
| 3 <input type="checkbox"/> ACCOUNTING      | 7 <input type="checkbox"/> ENTERTAINMENT   |
| 4 <input type="checkbox"/> DATA BASE       | 8 <input type="checkbox"/> OTHER _____     |

**PRODUCT MODEL NO.** \_\_\_\_\_ **SERIAL NO.** \_\_\_\_\_

This warranty is effective only in the USA.